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THE MATHEMATICS TEACHER

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Devoted to the interests of mathematics in Elementary and Secondary Schools
Editor-in-Chief—WILLIAM DAVID REEVE, Teachers College, Columbia University.
Associate Editors—VERA SANFORD, State Teachers College, Oneonta, N.Y.
W. S. SCHLAUCH, Dumont, N.J.

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W. S. SCHLAUCH

Honorary President of The National Council of Teachers of Mathematics

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Volume XLI  Number 7

Edited by William David Reeve

William S. Schlauch*

An Autobiography

So I AM nearing the end of the trail and am headed for the last round-up. How do I know? The doctor has ordered me to stop teaching, my friends and colleagues are treating me with extra kindness, and my good friend Dr. Reeve has asked me to send him a brief Autobiography of myself to be printed in THE TEACHER. So here goes.

I was born in a small town of 1200 in Lancaster County, Pennsylvania, one of the garden spots of the world. In my youth I delighted to roam over the farms, watching the crops mature, listening to the birds, and learning what I could from the farmers. The old creek where I fished seems shrunken now, due perhaps to a change of standards in myself.

However, the principal source of pleasure as I grew older was reading, and later study. My father was a teacher in his early manhood, and we had a number of books that were a mine of delightful material to children. I remember coiling up in a big chair with Grimm's Fairy Tales, or Robinson Crusoe, or Swiss Family Robinson, and entering the world of imagination, where marvelously bright images of other times and places carried me away from the present. Later, Goodrich's History of the World lifted the curtain on the great drama of the progress of the human race. While his interpretations were naive, compared with Robinson, Beard or H. G. Wells, he had a poetic touch that made one see Sargon heaping his jewels together, accumulating inflammable material, seating himself with his wives about him and firing his palace with his own hands and perishing in the flames.

Perhaps the greatest thrill came to me after mastering arithmetic. When I entered high school, I found Algebra fascinating. In the evening, often when my companions wanted me to come out and play, I preferred to sit at the table and solve problems in algebra. Geometry was equally fascinating, and helped me to decide to be a teacher of mathematics. I have always been glad I made that decision. For "The greatest work for character and extent, is the up-building of a man."

As to my later education, I attended and received degrees from Millersville, University of Pennsylvania and Columbia. But what of that? The point is that these institutions opened vast new fields and made me realize that there is no end to knowledge. Analytics and Calculus seemed marvelous, and then Calculus led to Dif-

* At the recent Indianapolis meeting of the National Council of Teachers of Mathematics Dr. W. S. Schlauch was unanimously elected Honorary President.

ferential Equations. Advanced Algebra to Modern Theories and Hyper-Algebraic Number Systems and Theory of Functions of a Complex Variable.

And in these institutions I became convinced that we live in a lawful universe. Even an elementary course in Astronomy showed that wherever we can measure the major controlling factors, we can derive a formula which enables us to predict a future configuration, knowing the present ensemble, by applying our formula thus derived. This power of mathematics, a tool evolved by men, made me feel that man is not all dust and ashes. In a course in Theoretical Dynamics I took with Professor Goodspeed at Pennsylvania, we were required in many cases to make our own measurements, set up our differential equations, and derive the primative, thus finding the functional relations among the forces involved in the problem. The ideal of method I there acquired I later used in the field of finance and business, when teaching at New York University.

It was at Millersville, then a Normal School, now a Teachers College, that I met Margaret Brosnahan, whom I later married. On graduation from that institution, I was invited to join the Faculty, and taught mathematics and history. Miss Brosnahan joined the Faculty at this time, and the inevitable happened. The walks, the boat rides, the trips to the theatre and the discussions of philosophy and methods of teaching can be of no interest to the reader, but form a host of memories for me. For all we have is hopes and memories, since the specious present has no continuity. A second ago has departed. Even as I am thinking, my thought is passing into the irrevocable past. Well, we were married, and I can testify from experience that there is nothing on this side of the Great Silence to compare with being happily married. We had three children: Margaret, who earned her Ph.D. at Columbia in English and is now a Professor of English at New York University, author of "The Gift of Tongues," a history of Scandinavia, and translations of certain Icelandic Sagas. Our son, William H., a victim of endocarditis in early youth, is living at home. Helen, now the wife of Professor Infeld at the University of Toronto, earned her Ph.D. in Mathematics at Cornell. These children were introduced to Shakespeare at an early age by their mother. I recall Helen, aged five, wandering through the rooms in Hasbrouck Heights, repeating:

"Lysander, Lysander, if you live good sir, awake."

She had listened to her mother reading Midsummer Night's Dream aloud.

I have taught at Millersville, the Eastburn Academy, and Germantown Academy in Philadelphia; the High School of Commerce, New York, as Head of the Mathematics Department. I have given courses in Teachers College, Columbia University, and the School of Education, at New York University. While serving in the High School of Commerce, I gave evening courses in the Mathematics of Business and Finance in the School of Commerce, Accounts and Finance of New York University. In 1929 I became full time teacher at New York University, school of Commerce, with the title of Assistant Professor; later Associate Professor, and now Professor Emeritus.

Have I contributed anything to humanity? I fondly hope and think so. When I walk the streets of the financial district in New York, it often happens that some one approaches with a smile, shakes my hand and tells me that he took my course in the Wall Street Division of the University or at the Square. That seems worth while. I have published, alone or in collaboration, four text books. The first, with Wentworth and Smith, was "Commercial Algebra, Books I and II." The next was "General Mathematics for Students of Business," the third "Business Arithmetic for College Students," and the fourth "Mathematics of Business and Finance" with Professor Lang. For this last text I have developed new formulas for cumu-

lative annuities and decreasing annuities, as well as new mathematical methods of valuing depleting assets.

To me the poetry of mathematics has always had a strong appeal. One evening after solving a somewhat difficult problem for a corporation accountant that involved mathematics, I composed a sonnet, and read it to my family. Helen was enthusiastic, but Margaret told me that as poetry it was "not so hot." Here it is:

Only the Brave may look on Beauty's face,
Search out her secrets, stand before her there
In temple vast of number, time and space.
Austere and cold, she guards her treasures fair,
Flashing a blinding light upon the race
Of rash, heroic creatures of an hour.
Searching infinity whose dazzling haze
Confounds Philosophy with Beauty's power.
Only the Brave will wander far by choice
From Euclid's realm, and in that wondrous maze
Of new relations, hear that thrilling voice
Proclaim the reign of law, necessity;
Even here perfection, lost each petty choice,
Surrendered in the law's great majesty.

My position at New York University in the School of Commerce opened the opportunity for work as consultant for accountants and business firms, and showed me many links between mathematics, business and its philosophy or economics. I suppose as recognition of some work that I have done along this line, came an invitation from the great English Economist J. Maynard Keynes, later Lord Keynes, to become a member of the Royal Economic Society, of which I am now a life member.

In my work as consultant, I have employed statistical theory, including multiple correlation as well as algebraic processes. I am convinced that in every field of human endeavor mathematics can be employed to obtain better adjustments, greater control, and less waste. I know from experience that this is true in science, business and education, and from consultation, that it is true in engineering and allied branches. And so I am glad that my life has been spent mainly in this field. I am grateful for the contacts it has brought me. The names Roddy, Hull, Fisher, Schwatt, Kaiser, Ling, Crawley among my teachers, and the host of live wires I have met as associates, such as Smith, Reeve, Clark, Schultze, Lang, Rosenkampff, and a host of others, call up pleasant memories and afford me pleasure as I fight the battles o'er in my enforced idleness. I look forward to regaining sufficient strength to do some work. In the words of Tennyson,

"How dull it is to pause, to make an end,
To rust unburnished, not to shine in use.
As though to breathe were life;
Life piled on life were all too little,
And of one, to me little remains.
But every hour is saved from that eternal silence,
Something more, a bringer of new things;
And vile it were for some three suns
To store and hoard myself and this gray spirit,
Yearning with desire to follow knowledge like a sinking star
Beyond the utmost bounds of human thought.'

Mathematics for All the Students in High School*

By GENE S. MCCREERY
Ball State Teachers College, Muncie, Ind.

THE PURPOSE of this study is to analyze the mathematics courses that are offered in high schools today, and to recommend some procedure that will better meet the needs of all high school students.

From a study of mathematics offerings in Indiana it is plain that a large majority of the high schools offer algebra and plane geometry. No advanced mathematics or general mathematics courses are offered. Most of these high schools are small; the teaching staffs are small and curricular offerings are meager. Most of the teachers are overloaded yet have a small pupil-load. Seven classes a day is not uncommon, and of course the extracurricular load must be handled by only a few. The student who wishes to take up engineering, science, or mathematics cannot get advanced mathematics. Sometimes he cannot get even plane geometry because there are not enough students who wish to take such a course. The student who does not expect to take up the sciences or mathematics must take algebra or not get any mathematics at all. Algebra may be good for the training of the mind of this student but does it best meet his needs? I am of the opinion that it does not. Only a starter is offered those who should go on in the field of mathematics and science, and very little is offered to meet the needs of those who are not interested in going to college.

Most of the city schools, organized under the 6-3-3 plan, offer a general mathematics course in the ninth year of school. Business education people offer some business arithmetic and the vocational education people offer some shop mathematics. The mathematics departments in the high schools (upper three grades) offer advanced algebra, solid geometry, trigonometry and college algebra; but very few offer a course for those not interested in traditional mathematics. Perhaps several graded courses in mathematics could be offered, at least an elective course in, let us say, consumer mathematics.

If the needs of some of the students are met, let us keep what we have; and if the needs of others are not met, let us make an attempt at studying those needs and make an attempt, at least, to meet them to the best of our ability.

The question arises: "Can we justify mathematics for all the students in high school?" In the first report of the joint commission of the Mathematics Association of America and the National Council of Teachers of Mathematics, *The Place of Mathematics in Secondary Education*, the needs of the ordinary citizen are discussed. Bear with me in an examination of this report and decide for yourselves if we are meeting all the needs that students have or will have in the near future.

"There will be given here an analysis of mathematical equipment needed for the activities and experiences of life. In discussing this question, the word need will be understood to denote not only knowledge or capacities as may be indispensable, but also attainments that may profitably be used in either utilitarian or cultural manner. In a very real sense such knowledge and capacities are actual needs to be provided for by schools. For it must be remembered, as has been said before, that the school has an obligation to create capacities of one kind or another, and should explain to pupils the advantages which may result from them, though it recognizes that in many cases the capacities will not all be employed.

"The paramount mathematics need of the average citizen is for a greater knowl-

* Paper read at the Annual Meeting of the National Council of Teachers of Mathematics at Indianapolis on April 30, 1948.

edge of arithmetic than is now common. By arithmetic is meant more than computational facility and understanding of principles. There is needed also familiarity with applications to a wide variety of problems or situations that confront people, and ability to understand certain mathematical ideas and procedures that may be encountered in ordinary reading.

"We need *arithmetic* in the home for (1) budgeting income, keeping accounts, checking bills, buying in quantity, buying in installment, estimating depreciation on home and car, buying or settling fire, burgulary, etc. insurance; (2) personal finances such as handling funds, depositing, checking, remitting, borrowing, paying loans and interest, saving and investing, choosing securities, buying life and disablity insurance and annuities, paying taxes, contributing to charities; and (3) recreational activities such as buying season tickets to sports, plays, lectures, music; planning trips, expense, time tables; arranging social functions; helping with neighborhood entertainment.

"We need *graphic representation* to understand numerous mathematical ideas which are commonly encountered in general reading—the line, bar, and circle graphs, and scale drawings.

"We need *algebra*. Although the average citizen rarely uses formal algebra as an instrument of calculation, it could so be used occasionally to advantage if its possibilities were understood. For instance, studying investments, installment buying, statistical aspects of one's business, solving mixture problems, or indeed in dealing most effectively with various matters listed under artihmetic above, one needs some command of algebra. For the average citizen, however, the chief need is for such algebraic knowledge as will give him insight into and appreciation of mathematical aspects of the modern world, scientific achievements, economic questions, and the like. In particular he needs to be familiar with: positive and negative numbers, formulas and the function idea, equations, coordinates, indirect measurement, modern methods of calculation, permutations and combinations.

"We need *informal geometry*. Some general knowledge is occasionally employed as a working tool about the home in such activities as making mensurational calculations, using a protractor and other instruments; but as in the case of algebra, the most important uses that the ordinary citizen can make of geometry are those by which he may achieve insight. For instance a good foundation in geometry will contribute materially toward an informed appreciation of matters relating to architecture and decorative art, engineering and manufacture, and natural forms.

"By the way of summary it is to be said that the important uses of mathematics for the ordinary citizen are in a large measure cultural. Mathematics provides the outlook and a means of understanding. These are important aspects of the world that only mathematics can interpret to the citizen. A liberal view of education regards such matters as genuine needs of even the ordinary citizen."

Most surely in this report nearly every mode of life was investigated and the mathematical implications studied. It would seem to me that we are not completely meeting the needs of our students. How can we better meet these needs?

Perhaps it will have to start within the teaching staffs of the secondary schools. Most of us are pretty well content to teach subject matter that has been taught over and over again for years, but if that be the case perhaps the communities will have to demand a revision of curriculum or the colleges preparing mathematics teachers will have so to educate them that they will start on this problem. Perhaps school administrators will initiate a new curriculum. At least a constant attempt to make better the offerings of our mathematics curriculum should always be foremost in our minds when we plan to meet the needs of all our high school students.

Perhaps instead of any one group's initiating such a program of curriculum study all groups should work together. This seems to me to be the most logical method.

The mathematics teacher can assist the student if he will help out on the guidance committee when the student plans his high school curriculum. Who should take algebra, geometry, trigonometry, solid geometry, college algebra, general mathematics, or consumer mathematics, shop mathematics, commercial mathematics, etc.? What are some of the criteria for determining?

A study was made in Cleveland by Herschel E. Grime, "Aptitude and Ability in Elementary Algebra," *School Science and Mathematics*, Volume 47, pp. 781–784. The Iowa Algebra Aptitude Test was given to 8A pupils. Its scores were added to a P.L.R. score made up of achievement scores, class grades in arithmetic, and intelligence quotients. Indexes ranged from 70 to 250, with a median of 145. Pupils with scores of 162 or above were urged to enter algebra. Those with 128 or below were discouraged from entering algebra. Between 129 and 162 additional material was needed to guide pupils. When questions were asked concerning existing correlation between scores on the Iowa Algebra Aptitude Test and success in elementary algebra and whether P.L.R. should be used along with the Algebra Aptitude Test score or whether the Algebra Aptitude Test score should be used alone in advising pupils concerning the election of algebra, it was found that the P.L.R. score did not materially increase the degree of correlation. The correlation between the Algebra Aptitude Test score and achievement in first semester algebra was .68; where the P.L.R. was used the correlation was .54. For this reason the Algebra Aptitude Test is administered to all 8A grade students. The scores have ranged from 1 to 97, 105 being perfect, with a median of 45. Pupils scoring 55 or above are urged to take algebra. Those making scores of 37 and under are not enrolled in algebra with the exception of those who, after conference with their parents, decline to follow the advice of counselors. For counseling in the middle group, those with scores from 38 to 55, counselors use additional evidence such as previous success in mathematics.

"Through the use of algebra aptitude tests boys and girls incapable of doing successful work in this subject are spared the waste of considerable time and energy and are led to direct their energies to mathematics courses adapted to their needs and abilities.

"Pupils with superior aptitude in mathematics, those to whom the next generation must look for its mathematicians, scientists, engineers, doctors, and the like are discovered early and are advised to enroll in the regular course in mathematics where they receive the type of instruction suited to their interests and abilities."

The first year after the war general mathematics was offered in our school. An effort was made to help guide those into the course who would not be able to get algebra, those who were poorly prepared in foundations of arithmetic, those who were more interested in taking something that would be of practical value to them. Criteria used for recommendations were as follows; Achievement score on the Stanford Achievement Test in Arithmetic. Intelligence Quotient, school grades, teachers' observations, and students' interests and plans for the future. The last year's recommendation sheet was supplemented by the Iowa Algebra Aptitude Test scores. The people who fell below the 25 percentile rank were advised not to take algebra. At the same time, the Iowa Algebra Aptitudes Test was given to the general mathematics students at the end of their second semester of work. Twenty of the twenty-six indicated that they wished to take algebra the following year. All twenty of these ranked above the 30th percentile on the Iowa Algebra Aptitudes Test. Some of those twenty, six to be

exact, fell below the 50th percentile, and the other fourteen above. This year, of those taking algebra, only four are not making average grades. One of the others has turned in A and B work. Four have turned in B work, and the others average work. Records will be kept to study the success of general mathematics students in algebra. One group is not enough on which to base conclusions. One variant factor is the study habits of the individuals, no doubt.

What can be offered to those to whom we do not recommend formal algebra? A general mathematics course seems to be the answer. A mathematics that can be applied to economic problems of the home, personal finances, recreational activities—living in general. An elective course in consumer mathematics should at least be offered in the junior or senior year for any student who could or wanted to take it. Too often students pass over many of the practical things while taking the traditional courses and really enjoy a course in consumer mathematics where they can get closer to problems they meet or will meet and at the same time have a chance to "sharpen up" on their computation. I suspect that eighth graders could do better on an arithmetic achievement test than seniors just because the seniors have been away from the study for four years.

While working on this paper I have read of others who had experience similar to mine with the teaching of general mathematics. Two years ago last spring we held a conference of the mathematics teachers in the building and decided that we should offer a course in general mathematics to those who were wasting time taking algebra. I heartily agreed with such a suggestion, not anticipating an sssignment to teach a course. The next fall it fell my lot to teach such a class. Frankly I was stumped. We had some rental texts that were quite old and fashioned toward business arithmetic. I ordered text books from one company, but they could not supply my wishes. Finally I had an order accepted, but the books arrived late in November. Well, we studied business.

My attitude toward the situation was that I had been given all the discipline problems of the ninth grade, all the dumbbells, and perhaps all the students who despised mathematics from a long time back. I treated them as though I knew they were of that nature. Expecting the worst, I used the iron-hand methods sometimes employed when one is at the end of his string of tricks. For a month things had not changed a bit. If anything, my patience was getting pretty well worn. An assignment would be given, but not worked. A tongue lashing would be administered and the room quieted but no positive results came forth. Finally I decided to pry into the situation. About half of the group had planned to take algebra for college entrance. Some of these felt that their intelligence was insulted by taking general mathematics and were just plain provoked for having to take it. Others had never been able to get mathematics and still did not think they could get it; in fact they were not even trying. A few were sitting without trying because their mother or father had not been able to get mathematics. They knew they could not get it. The first place to start working on this group was to get them interested in something, anything.

Luckily I had been assigned to take a school census and had maps of the area on the bulletin board. Upon entering the room I noticed several students looking at the maps and pointing out places where they lived. From there we started our class discussion. And several told and showed where they lived—so many streets to the right or left, up or down. Everyone was interested immediately. When asked where a certain store was, a student remarked that it would be easier to tell where the store was from the corner of Tillotson and University. From this statement we decided that we always had to start from some place common to the knowledge of all before it did any good to

give directions. One thing led to another until we gave the starting point zero distance and called it the origin. Then so many streets north was up or positive and so many streets south was down or negative direction on the map. To the right or east when looking at the map with north up was given a positive direction and west was given a negative direction. Then we began locating points that were on the map and giving the points value and direction from a place called the origin or the corner of Adams and Dill Streets. I could not believe my eyes; for I had had algebra classes which never caught on to the idea of coordinates as these students had. We did not go into the detailed algebraic graphing of equations, but we at least had an idea of direction, of plus and minus numbers. We did do a small unit on the collecting of plus and minus numbers immediately following our work on the map. We found directed numbers were used in many other ways than that of direction on maps. The student participation began to pick up and the class was much more enjoyable for the students as well as for their teacher.

A unit on buying was introduced. We really had to laugh at some of the problems when we discovered that the prices for food, etc. were so low. We decided to do the same problem only substituting the new prices. A plan for a party was described in the text so we assigned committee chairmen and worked out our problems. When the problems were solved and prices had been studied everyone clamored for a party. We decided to have a party after school and assigned an additional committee to work on entertainment. Everyone enjoyed the party. We learned a little arithmetic and the teacher-pupil relations were strengthened.

From then on my enjoyment of this class in general mathematics grew. Where there is interest and enthusiasm a lot of work can be completed. We studied scale drawings; homes and buildings; geometrical design; mensuration; useful formulas; simple equations; graphs—circle, bar, picture, and line; construction in concrete and lumber; household—cookery, sewing, knitting, etc. The upkeep of the home; insurance—life, automobile, fire, burglary, wind, lightning, and flood; stocks and bonds; investments; installment buying; mathematics tables; ratio and proportion; simple equations; and heights—trees, buildings, etc. were other problems which we studied. When we discovered that we needed some review of fundamentals, we took time out and worked on some basic concepts, then did some drill. When there is a need and the student can actually experience that need, it is not nearly so difficult to help him meet it. Our book had an appendix that was devoted to remedial work on about every type of work basic to the solving of problems. At the end of a unit of work we would test and check, then do remedial work and retest. Personal student assignment to remedial work was given at times, but generally speaking reference to the work was sufficient.

In this class it seems to me that the needs of the student were being met. A touch of algebra and intuitive geometry were given. Students who wished to take algebra as their next course in mathematics were allowed to do so even though some were encouraged to do otherwise. Surely a general mathematics course gave those students who took it a broader view of mathematics as it works in daily living than would a course in specialized business mathematics or shop mathematics. At the end of a year of general mathematics, a course in specialized mathematics such as business mathematics, shop mathematics, or even algebra would surely be better understood.

This year the stigma of general mathematics had been lifted somewhat. Perhaps I had better state that it had been lifted from both students and teacher. There were those who had been guided to take general mathematics because of parental pressure.

We have had quite an enthusiastic group this year. This group particularly enjoys working on projects. The mathematics department was asked to plan an exhibit in one of the hall display cases. I mentioned it to this group. Immediately they started to work on an idea that would get the interest of the student body. Basketball was under way and that was the topic of the school in general; so they capitalized upon basketball. Next they tried to imagine how we could relate mathematics to basketball. We had been studying bar graphs; so they decided to make a graph of the points made by each player. Three games had been played and they decided that the graph would run off the large cardboard for a few players; so they decided to graph the average points per game. In figuring the average points per game we developed a general formula and decided to put it on the graph. Some thought that the graph would be looked at but the formula would be overlooked; so they made a rhyme to the effect of L.S./M.F.T. and broadcast it during announcement time on the loud speaker system. A committee was appointed to work out a script for the short announcement to advertise the display. Another group made a scale drawing of a basketball court; another made a goal, backboards, and standards; another crocheted nets; others made miniature players and a ball. Still another committee worked out a display chart on white cardboard using a color scheme of blue and gold. The lettering was titled "As the Owls Add 'Em Up," under which came the formula, then a bar graph giving a picture of average points scored. In another spot a place was given for games won and lost. The students kept the averages up for the remainder of the month. Flocks of students came to see the display and many asked what the formula meant. Several other groups used the exhibit on different occasions. Much of this work was done on free time, but occasionally class time was used to organize the project and vote on what was to be done. During this time class work did not stop; we had our daily assignments to complete. The students enjoyed doing the work. They accomplished something as a group that won recognition. This particular group had not participated in things that won recognition before. Generally others more able had been assigned extra work. Confidence in them seemed to inspire them to something a little out of the ordinary.

At present we are building a house. It started from our study of scale drawing. Each student had been making floor plans. All were reading magazines, bringing plans to class and drawing plans for their own dream houses. We have some boys that are in vocational classes and one was particularly interested in a drawing that appeared in our text. It seemed to have many desirable qualities and he wondered what it would look like from the outside if it really existed. Of course elevations had not been included in the text and my idea would have been only one of many, so we suggested that those interested try drawing elevations. The very next Monday this one boy came in with his ideas of what the house would like from two or three different sides. Others looked at the elevations and made suggestions which were incorporated. Someone mentioned it would be fun to make a model house like the plans. Jim, the boy who drew the plans, came back shortly with a paste-board model. Several were then ready to do a scale model (35″×37″ approximately). This sounded pretty tough to me. It also presented a problem to find time to do it. But if the students felt that they could find time I felt that I surely should be able to find time to supervise it. We have started the house. One boy brought a large piece of beaverboard. It is solid enough for a base. Waste pieces from the shop were collected and miniature pieces were cut to scale to represent 2″×6″'s and 2″×4″'s. A box of brads was donated. We held an organization meeting and had different groups plan bills of materials for the many

parts of the house. A group was to figure the number of 2″×4″'s in the outer walls; another figured 2″×4″'s necessary for the inner walls; another group figured 2″×6″'s necessary for the roof; still another figured on the siding; another the wall surfacing and interior decorations; another on painting the exterior; and another group worked on plumbing and electrical wiring and heating; and lastly another on excavation and landscaping and cement work. After we started, someone suggested that we make a doll house out of it and furnish it and when finished give it to the Orphan's Home. At the present time we have made out small bills of material and called lumber yards to get quotations. We have figured lumber problems by the running foot and by board foot. We have made scale drawings, tracings, and blueprints of our plans. We have books on architecture, electrical wiring, design, and decorating, and pamphlets on various phases of plumbing, appliances, heating, etc. When we run into a problem that stumps us, we refer to the books and study. The size of the structure makes it difficult to do hammering so we are using a method of construction for our framework that is in line with some of the new construction methods. A section is nailed together before it is put up. That way we do not have to do a lot of toe-nailing of studding. We rotate our carpentry work so that all have a chance to work at the job. While some work, others do their studying. We have a general recitation at the beginning of the hour where all participate. Then we work by turns on the house. Generally I open my doors at noon a little early so a little added time can be captured for our work.

This year's class has been as different as night from day when compared with last year's class. This group enjoyed projects and initiated them. Many class projects fall flat because they are not initiated by the students. We do overlook many opportunities, however, because they interfere with our set plans for a well ordered course. The students many times in discussion or in out-of-class activity, or in personal hobbies, or many other ways tell us how we can capitalize on their own interests to bring our work down to something they can understand, enjoy, and make useful. We have taught traditional mathematics in a fixed manner until it has become a habit. It has become difficult for us to become flexible enough to teach any other way.

In conclusion may we remember that in this ever-changing world many of our traditions have proven excellent and many changes are also adding to our progress and culture. A broad understanding of our own problems and problems of others helps us successfully to get along in this world. Our schools should make their offerings meet the need of all their students. Mathematics is only a part of that offering, but it is a most essential part and can be made more valuable to all of the students in high school.

MATH*

A lovely teacher,
A bar or graph,
Some energetic students,
And we have math.

A problem to be solved;
A decimal point causes wrath!
A lot of thinking is involved,
But—that's math!

SALLY MCCORMICK

* Contributed by Lena Broomhall, Zanesville, Ohio.

Using Special Interests to Stimulate the Study of Mathematics*

By IDA MAE HEARD

Southwestern Louisiana Institute, Lafayette, La.

THE original traditional course in high school mathematics was college preparatory in nature. The teacher's time was largely spent in trying to pour facts into the youngsters rather than in drawing the youngsters out or in leading them toward the subject. If a student failed to pass the work, his failure was said to be caused by any of the following: a lack of application, stubborness, or laziness. This course of study made little provision for different interests, different abilities, or different needs.

The high school teacher of today recognizes these differences in interests, abilities and needs. He makes provision for such differences in planning his work. He tries to fit the mathematics to his student rather than fit his student to the mathematics. Proper courses of study help to take care of the differences in abilities and needs. Different textbooks, different teaching techniques and different types of teachers all play an important part, but I wonder if we teachers of mathematics fail to capitalize on the special interests and talents of our students. By knowing the pupils we teach, we can use their special interests and talents to enrich their study of mathematics and to stimulate their further study of mathematics. Let us consider some of the talents and interests that these high school youngsters have. There are students who like art, who like to paint. These youngsters might be introduced to the dramatic form of non-objective painting. This type of painting uses geometric forms in its composition. The artist has no object in mind when he paints. His use of color, form, and his arrangement combine to give the looker that feeling of ecstasy that one gets when he sees a beautiful sunset or listens to a favorite symphony. Any of Rudolf Bauer's work should fascinate the young artist. Take "The Holy One," "Colored Swinging" and "Delicacies" as interesting examples.

Then we have the cartoonists ever with us. Too often these youngsters are busy drawing the teacher's picture instead of getting at their mathematics. Let us make use of their talent. One of the cleverest pieces of illustrative work that I ever saw was done by a student who drew cartoons for the story, "The Banquet of the Angles," which appeared in THE MATHEMATICS TEACHER, March, 1933. Let the whole class save cartoons pertaining to mathematics that appear in the newspapers and magazines. All this helps to add a little spice to the work.

Think of the student who can letter. His contributions to the class are many. His talent is invaluable in making posters or charts. He might do lettering for another student's work that would be spoiled otherwise.

Then we have the tinkerers. How lucky we are for they can use their mechanical aptitudes to make all sorts of models that bring mathematics to life. There's something extra special about a gadget that moves, that can be handled, that makes a topic like locus enjoyable.

We must not overlook the photographer. He can do a splendid job in supplementing the text by finding places where certain principles are applied.

I recall an excursion that a group of students made to photograph examples of perspective. Another group visited a library where ancient measuring instruments were kept and made photographs of them and some old geometry books. Still

* Paper read at the Annual Meeting of the National Council of Teachers of Mathematics in Indianapolis in April, 1948.

another group made a series of pictures to show geometric shapes and principles in art, nature and architecture. This field is very fertile and what fun awaits for the venturesome teacher and his pupils.

There are those who can write either prose or poetry. Allow the future playwright to try his hand at an assembly program that would popularize the subject of mathematics. Then we have the poets who can write about the beauty of a snowflake and its intricate design.

There are those avid lovers of history who can delve into the history of mathematics and lend romance to the mathematics being studied. A discussion of the Three Famous Problems of Antiquity would stimulate a lot of thinking. A linkage that would trisect the general angle could be made when the geometry students were discovering the relationship between the exterior angle of a triangle and its two remote interior angles.

There are many other ways that the teacher can capture the interests of his students if he really knows them as he should. Everyone profits from this type of procedure. A student's interest in the study of mathematics is often whetted. The student takes pride in being able to make a contribution to the class through some special talent of his. By saving the best materials developed by each class the teacher can share the fruits of such endeavors with future classes of mathematics and with fellow teachers of mathematics. By allowing the students to have a part in planning some of the activities the students feel that they really count and that the teacher isn't running a one-man show. A more favorable attitude toward the whole study of mathematics should be developed. Many of the results will be tangible. Better mastery of the subject matter should be realized. Other outcomes, which are perhaps more important, are less tangible. The feeling of kindness toward a helpful teacher, an appreciation of the part mathematics has played in the development of civilization should linger long in the hearts and minds of these students. Let us not forget the words of St. Paul when he said, "While we look not at the things which are *seen*, but at the things which are *not seen*, for the things which are seen are temporal; but the things which are not seen are eternal."

Final Notice

THE NINTH CHRISTMAS MEETING
OF THE
NATIONAL COUNCIL OF TEACHERS OF MATHEMATICS
OHIO STATE UNIVERSITY

WEDNESDAY AND THURSDAY, DECEMBER 29 AND 30, 1948

Announcement of Program may be found in the October issue of THE MATHEMATICS TEACHER, pages 290–292.

Requests for room reservations should be sent to Mr. Oscar Schaaf, Room 120 Arps Hall, Ohio State University, Columbus, Ohio.

Reservations for Discussion Groups and Clinics should be sent to The National Council of Teachers of Mathematics, 212 Lunt Building, Northwestern University, Evanston, Illinois.

A Graphometer

By HOWARD EVES
Oregon State College, Corvallis, Ore.

ONE OF the most interesting mathematical museum pieces might have been a certain oui-ja board, or more properly speaking, planchette, used in England sometime in the late nineteenth century. Since the controlling spirit of the planchette was believed to be a one-time senior wrangler, two young ladies were led to ask the planchette to write the equation of its own bounding curve. Three or four times the board quite distinctly gave the polar equation

$$r\theta = a \sin \theta.$$

Because of an incorrect plotting of the locus of this equation, the young ladies felt the board must be fibbing. However, when their mathematics instructor correctly plotted the locus, the ladies were surprised to see the remarkable resemblance between the locus and the bounding curve of the planchette [1].

The locus appears as in figure 1. It is

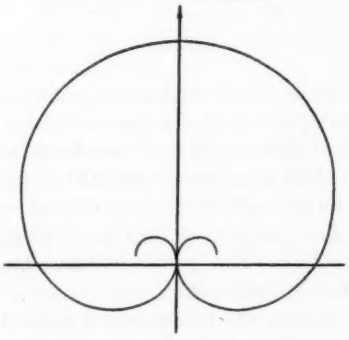


FIG. 1

symmetric in the polar axis, and in each half of the plane there is an infinite number of nesting ovals, all tangent to the polar axis at the pole. The intercept on the polar axis is the constant a.

Since this curve enjoys the probably unique distinction of having been given by the oui-ja board, and because the only other name ever given to the curve, the *cochliod*, has also been given to other curves [2], we propose here to name the curve the *oui-ja board curve*.

The oui-ja board curve possesses a number of interesting geometrical properties [3], of which we shall here consider only those bearing upon its application as a graphometer for multisecting angles, recitfying circular arcs, and locating centroids of circular arcs and sectors. A celluloid template of the form of half an oui-ja board curve, as indicated in figure 4, would, by virtue of the following theorems, make a useful draftsman's tool. The curve seems to have been overlooked by writers on graphical calculus. In certain aspects it seems superior to the similarly used spiral of Archimedes, hyperbolic spiral, and circular involute [4].

We first establish three lemmas:

LEMMA 1. *If upon all the circles of a coaxial tangent system a constant arc length is measured from the common point of tangency O, the locus of the end points of these arcs is the oui-ja board curve* [5].

Let the constant arc length be a, and let P be a point on the locus, given by a circle of radius R. Then we have (see figure 2), if the common point and com-

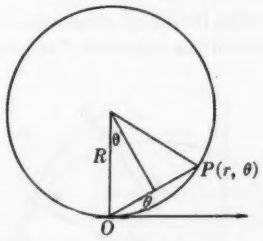


FIG. 2

mon tangent of the coaxial system of circles is taken as a polar coordinate frame of reference,

$a = 2R\theta$ and $r/2 = R \sin \theta$. $r = (a/\theta) \sin \theta$, $\theta = \theta$.

Eliminating R we obtain the equation of the oui-ja board curve.

LEMMA 2. *Consider a variable isosceles triangle OVP, where the point O and the trace of the leg OV are fixed, and the vertex angle PVO varies inversely as the distance OV. Then the locus of P is the oui-ja board curve* [6].

Choose a polar coordinate frame of reference as indicated in figure 3. Denote

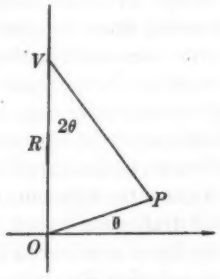


FIG. 3

OV by R and angle PVO by 2θ. We then have essentially figure 2, and the lemma follows from lemma 1.

LEMMA 3. *The oui-ja board curve is the locus of the centroid of a variable arc measured from a fixed point A of a circle O(A).* [7].

Let a be the radius of the circle and 2θ the central angle of the arc. It is then well known that the centroid of the arc lies on the bisector of the central angle at a distance $(a/\theta) \sin \theta$ from the center of the arc. Therefore (see figure 4), if we take OA as a polar frame of reference, the polar coordinates of the centroid C of arc AB are

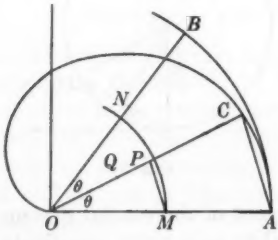


FIG. 4

Thus the locus of C is an oui-ja board curve with "center" O and having OA as axis of symmetry.

With the aid of our three lemmas we now establish the following three theorems which justify using the oui-ja board curve as a graphometer.

THEOREM 1. *The oui-ja board curve may be used for dividing a given angle into any number of equal parts. Thus this curve can be employed to solve the ancient problem of trisecting an arbitrary angle.*

Let O (see figure 5) be the "center" of a given oui-ja board curve, OA its axis of symmetry and OD perpendicular to OA. Let AOB, B on the oui-ja board curve,

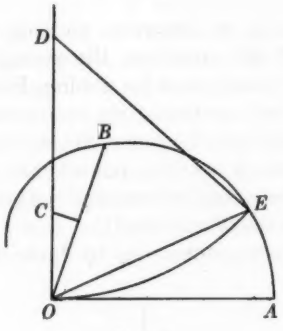


FIG. 5

be an angle which we desire to divide into n equal parts. Let the perpendicular bisector of OB cut OD in C. Mark off $OD = n\ OC$. With D as center and DO as radius draw an arc cutting the oui-ja board curve in E. Then angle AOE is $(1/n)$th the given angle AOB. The proof is immediately supplied by lemma 2.

Of course, the oui-ja board curve now also permits us to construct a regular polygon of nine sides; all we have to do is to obtain an angle of 40° by trisecting the easily drawn angle of 120°.

THEOREM 2. *The oui-ja board curve may be used for constructing a straight line segment equal in length to a given arc. In particular, this curve may be used to solve the ancient problem of squaring the circle.*

Let O (see figure 6) be the "center" of the given oui-ja board curve, OA its axis of symmetry and OD perpendicular to OA. Take OC equal to the radius of the

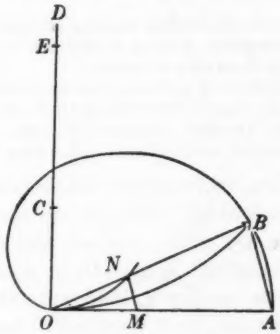


FIG. 6

given arc, draw the circle $C(O)$ and mark off arc ON equal to the given arc. Let ON cut the oui-ja board curve in B. Draw NM parallel to BA to cut OA in M. Then segment OM is equal in length to arc ON.

The proof is easy. Let E on OD be the center of the circle through O and B. Then for this circle, segment OA is equal in length to arc OB (by lemma 1). Hence, by similar triangles, the segment OM is equal in length to arc ON.

Note that the arc is rectified along the initial tangent, often a desirable feature in graphical work.

To square the circle take arc ON as, say, a quadrant of the circle $C(O)$. Then OM is one fourth the circumference of circle $C(O)$. Construct a rectangle having dimensions OC and 2 OM. The area of this rectangle is then equal to the area of the circle $C(O)$. The mean proportional between OC and 2 OM will thus be the side of a square equal in area to the given circle $C(O)$.

THEOREM 3. *The oui-ja board curve may be used for constructing the centroid of a given circular arc or sector.*

In figure 4 let MN be the given arc. Draw MP parallel to AC to cut OC in P. Then P is the centroid of arc MN. The proof follows immediately from lemma 3.

The centroid of a circular sector is also easily constructed. In figure 4 consider the given sector OMN and let Q be its centroid. Now it is well known that $OQ = (2/3)OP$. Hence, once P is found, Q is readily located.

NOTES AND REFERENCES

1. The planchette incident is rather completely written up in Sir Oliver Lodge, *The Survival of Man*, pp. 130–134.

2. The conchoid of Nicomedes has been called the "cochlioid" by Pappus. The conchoid of Nicomedes is also referred to as the "cochloid" by Ganguli in his *Theory of Plane Curves*, vol. 2. Apollonius of Perga called the quadratrix of Dionostratus the sister of the cochlioid; see P. Tannery, *Bulletin des Sciences Mathématiques*, 1883, p. 283. The quadratrix of Dionostratus is the inverse of the oui-ja board curve with respect to its "center" as center of inversion. In more recent times Benthem and Falkenburg have associated the name "cochleoide" with the curve of this paper. See, e.g., *Nieuw Archief voor Wiskunde*, t. X, 1876, p. 76. Benthem notes that E. Catalan in *Manuel des Candidats à l'Ecole Polytechnique*, vol. 1, 1857, p. 331 gave the equation of the curve. Gino Loria in *Spezielle Algebraische und Transcendente Ebene Kurven*, 1902, pp. 418–424 discusses the similar equation $r(\pi - 2\theta) = 4a \cos \theta$, which was considered in 1706 in an anonymous article in the *Philosophical Transactions of the Royal Society of London*. E. Wölffing has shown that this anonymous article was by J. Perks.

3. See Roscoe Woods, *American Mathematical Monthly*, vol. 31, 1924, pp. 222–227. This paper investigates several properties of the tangents and normals to the oui-ja board curve. Also see L. S. Johnston, *American Mathematical Monthly*, vol. 40, 1933, pp. 596–598.

4. See, e.g., L. Cremona, *Graphical Statics* (translated by T. H. Beare), 1890, p. 39 and pp. 114–117.

5. This locus was considered by Bernoulli and Goldbach in 1726, and leads to a euclidean asymptotic solution of the circle-squaring problem. Also see problem E 41, *American Mathematical Monthly*, 1933, p. 609.

6. See Falkenburg, *Archiv der Math. u. Physik*, first series, 70, p. 257. Falkenburg discovered the oui-ja board curve in connection with the design of the starting gear of a steam engine.

7. See E. Egger, *Ann. di Matem.*, 1864, p. 21; L. Stoekley, *Archiv der Math. u. Physik*, first series, 1868, p. 110; M. Gomès Teixeira, *Tratado de las curvas especiales notables*, 1905, p. 394. Haton de la Goupillière in *Comptes Rendus de l'Académie des Sciences*, 1906, p. 1130, has considered the more general problem of finding the locus of the center of gravity of a variable arc, measured from a fixed point, of a circle, where the density at any point of the arc varies as the n-th power of the length of the arc to that point. Lemma 3 is the case where $n = 0$.

A Lesson in Appreciation; the Nine-Point Circle

By ROBERT E. PINGRY
Ithaca, N. Y.

"GEE, Look! The circle goes through every one of the nine points."

"Isn't this interesting."

"You mean it can be proved that a circle always goes through those nine points?"

"I like to do this."

These and other similar comments were oral expressions of appreciation of the beauty of a geometric relationship. The students in a tenth year geometry class had just completed a project of making a geometric construction demonstrating the nine-point circle theorem and related properties. The lesson in appreciation was a success. By making the above statements the students had passed their test.

The students in this geometry class worked very carefully to accurately locate the nine points of the theorem. There were many dramatic moments as the various members of the class opened their compasses to the proper radius, placed one point of the compass on the proper center, and then watched anxiously as the pencil point of the compass passed successively through each of the nine points. They received the satisfaction of a job well done, but they also had the opportunity to view one of the most beautiful theorems in plane geometry, the nine-point circle theorem.

Teaching for appreciation has been listed as one of the teaching aims by nearly all who have studied the place of mathematics in education.

In the Progressive Education Association report on the function of mathematics in general education consideration was given to this phase of mathematics teaching.

> Appreciations are characterized by enjoyment. To appreciate deeply means to cherish, to esteem, to prize. . . . Enjoyments may emerge from reading a poem, seeing a piece of sculpture, watching a machine, working through a demonstration in mathematics, making an experiment in the laboratory, solving a problem in human welfare, or observing a sunset.[1]
>
> The teacher of mathematics may contribute to growth in sensitivity to the esthetic quality of experience through appropriate use of the unique content and methods of his own field.[2]

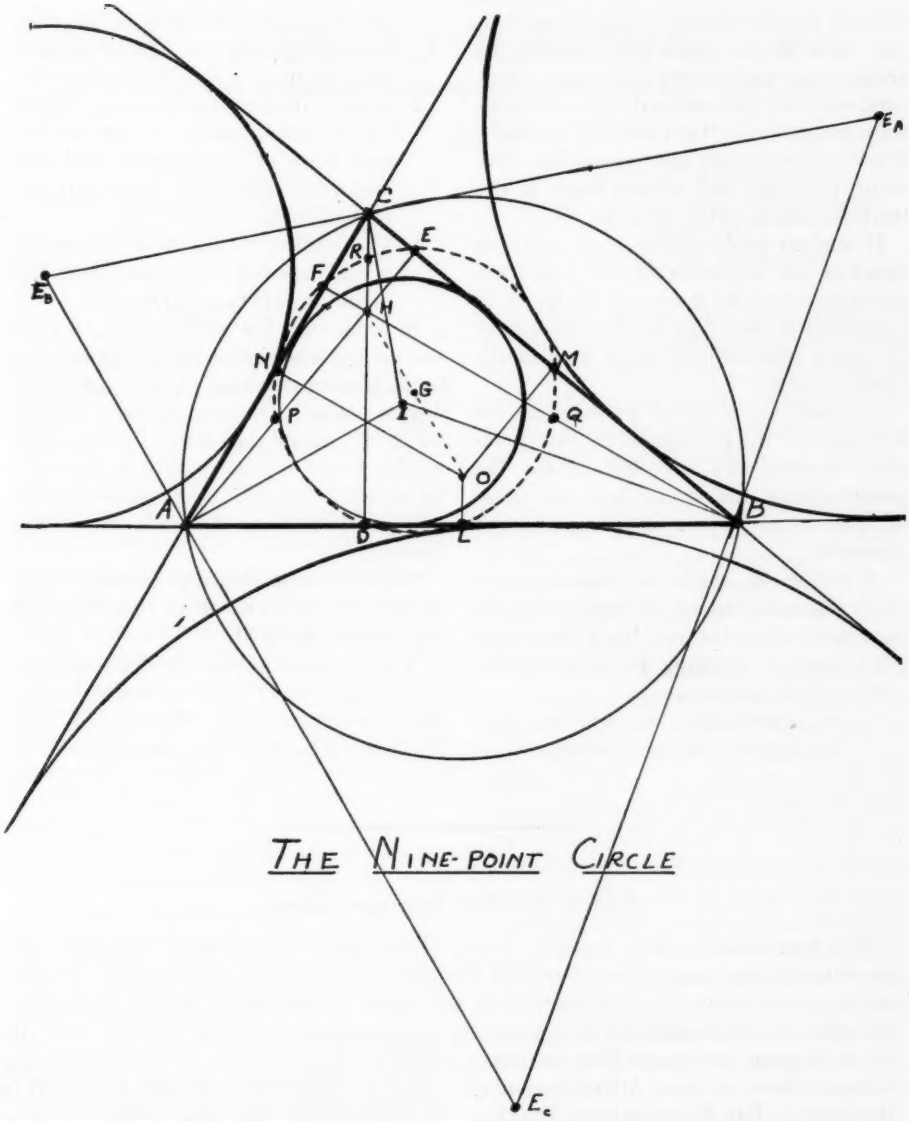
Are we as mathematics teachers making this contribution? How do we make appropriate use of the content and method of mathematics? Is growth in sensitivity to esthetic quality gained automatically or is a special effort required to teach for appreciation?

Many teachers who really feel the beauty of mathematics and realize the place of mathematics in our civilization probably do a good job of teaching for appreciation without making a special effort. Their own enthusiasm for the subject is caught by the students. There are other teachers to whom mathematics means a set of rules, a catalogue of manipulations, a tool subject, and a body of skills. These teachers probably could not teach for appreciation by any amount of effort or by any method. There is a third group of teachers, however. These teachers do have appreciations for mathematics, but they are so busy "getting over the required material" or getting their students ready for examinations that the students never get the time or the opportunity to look at the beautiful.

One of the principal objectives for the project of the geometric construction of the nine-point circle, as is advocated here, is to provide an opportunity for the students to view the beauty and power of mathematics as is demonstrated by this theorem.

[1] Commission on Secondary School Curriculum of the Progressive Education Association; Mathematics in General Education, "Report of the Committee on the Function of Mathematics in General Education." (New York: D. Appleton-Century Company, Inc., 1940) p. 33.

[2] Ibid., p. 49.



THE NINE-POINT CIRCLE

The Nine-Point Circle Theorem:

The mid-points of the sides, the feet of the altitudes, and the mid-points of the segments joining the vertices to the orthocenter of any triangle lie on a circle.

Some properties of the nine-point circle:

1. The radius of the nine-point circle is half of the radius of the circumcircle of the triangle.
2. The center of the nine-point circle is the mid-point of the segment joining the orthocenter and the circumcenter.
3. The nine-point circle is tangent to the incircle and to each of the ex-circles of the triangle. (Feuerbach's Theorem)

Here is a theorem stating that a circle passes through *nine points* and a further

theorem stating that it is also tangent to *four other circles.* Isn't this enough to arouse some enthusiasm and cause a student who had just realized these relationships to question, "Isn't this interesting?" These students had not proved the theorem, but they had viewed some of the intrinsic beauty of the theorem.

If student exclamations such as those listed at the beginning of this paper are any measure of the success of the lesson in appreciation then this lesson was one of the most successful of those used in the writer's classes.

Although the proofs of the theorems are not easy for the average tenth year geometry student and are not given, the constructions and vocabulary are those of the usual course in demonstrative geometry.

A project in which the students complete the construction demonstrating the nine-point circle theorem has values other than that of teaching for appreciation. Among these values are

1. An opportunity for excellent practice in geometric constructions If the pencil of the compass is to pass through the nine points, extreme care must be used in locating the points.
2. A good review or a teaching device for the relationships of the concurrent lines of the triangle and the inscribed, exscribed, and circumscribed circles.
3. The chance to have a laboratory period for a day or two and break the monotony of the usual routine.

In order that the construction be neat and open it is advisable for the students to begin the construction on about a 60–40 degree triangle. Drawing paper of at least 12″×18″ should be used. Construction marks should be made lightly so they may be erased if desired, and colored pencils will greatly increase the readability of the drawing.

Some of these drawings carefully done in color will make excellent bulletin board and exhibit material.

The students in the writer's classes have always enjoyed this project and as long as such exclamations as "Gee, Look" are made the lesson will remain in use.

Notice to State Representatives

The first, second, fifth, seventh, ninth, tenth, eleventh, twelfth, thirteenth, and seventeenth yearbooks of the National Council of Teachers of Mathematics are now out of print. Only a limited number of the third, fourth, sixth, eighth, fourteenth, fifteenth, sixteenth, eighteenth, nineteenth, and twentieth yearbooks are left. Will you please do your best to see that teachers who have not secured any of these remaining volumes do so at once. Advertisements for most of these books are not contained in this issue of THE MATHEMATICS TEACHER, but they appear from time to time.—Editor

If you can find time, you can help the Council greatly by seeing to it that the Guidance Pamphlet in Mathematics is given more publicity. It would be a fine thing if at each meeting of mathematics teachers someone could be delegated to have some of these pamphlets for sale. THE MATHEMATICS TEACHER will be glad to send on assignment whatever copies are needed.

◆ AIDS TO TEACHING ◆

By

HENRY W. SYER
School of Education, Boston University
Boston, Massachusetts

DONOVAN A. JOHNSON
College of Education, University of Minnesota
Minneapolis, Minnesota

BOOKLETS

B. 12—*Handbook of Life Insurance*
Institute of Life Insurance; 60 East 42 Street; New York 17, N. Y.
Booklet; $5\frac{1}{2}'' \times 8''$, 64 pages; free.

Description: This booklet has twenty-six sections grouped under four headings: the social aspects of life insurance, how life insurance operates, buying life insurance, and pointers for policyholders. The second of these sections will be the most useful in mathematics, it discusses the following questions: What are participating and non-participating policies? What are the different types of companies? In what forms is life insurance available? What are the different types of life insurance policies and their uses? What is an annuity? How is your premium figured? How is your policy safeguarded? What value does your policy have if you stop paying premiums? What are the income provisions in your policy? What are dividends and how may you use them? A bibliography is included at the end of the booklet.

Appraisal: There is little in this booklet that would lead to computation, but for those teachers who accept mathematics as the proper place to teach about insurance, and who see the need for teaching the social implications as well as the formulas, it is a condensed, accurate account of insurance and practices. There may be too much detail for each member of ordinary mathematics classes to use it as a text-book, but it should certainly be available as a reference book. Business mathematics classes may wish to have one for each pupil. The book has no particular ax to grind; it does make the tacit assumption that life insurance is a good thing for everybody to have. This premise should probably be examined by classes critically, but few can disagree with it.

B. 13—*A Dictionary of Insurance Terms*
Employers Mutual Insurance Company of Wisconsin; Wausau, Wisconsin
Booklet; $4\frac{3}{4}'' \times 7\frac{3}{4}''$, 71 pages; free.

Description: Many useful definitions of common terms used in insurance are given in non-technical language. Some of the definitions are followed by examples, often with a numerical problem worked out to show the meaning of the word or phrase defined. The bottom inch of most of the pages is filled with propaganda for Employers Mutual Insurance.

Appraisal: For classes which are doing regular work or special, individual projects on insurance, some book of this type is indispensable. This one is quite adequate. Other companies intending to produce similar literature should resist the temptation to intersperse such useful material with so much advertising; more would use it.

B. 14—*Convenient Tables and Formulae*
Westinghouse Electric Corporation; East Pittsburgh, Pennsylvania
Booklet; $4'' \times 6\frac{3}{4}''$, 51 pages; free.

Description: Here one can find reference information for electrical work. There are definitions; equivalent values; conversion factors and tables; many useful constants, formulas and diagrams.

Appraisal: Most of the material in this booklet is too advanced for high school pupils, even those in shop courses. However, the sight of so much mathematics being made available to engineers and the possibility of introducing a class to the use of some of the more common tables and formulas in the booklet will indicate a bridge between the mathematics of school and the mathematics of the world. This might serve as the spark of interest for many; too often such easy, slight allusions to the application of mathematics are overlooked because the mathematics teacher is usually a thorough-going person.

CHARTS

C. 5—*The World Calendar*
World Calendar Association; 630 Fifth Avenue; New York 20, New York
Chart; 14″×34″; free.

Description: This chart shows the permanent world calendar recommended by the World Calendar Association to replace our present variable one. It contains twelve months as now, but January, April, July and August contain 31 days, all the rest 30. There would be an extra day December W (or 31) added every year, and another June W (or 31) added on leap year. These would be world holidays and would not be named any of the days in the week.

Appraisal: Proposals to change the calendar or the base of the number system usually strike the same type of opposition as suggestions that there are other geometries than Euclidean. The ability to consider other systems than our own is one objective in mathematics; here is another calendar. Moreover, it is an interesting exercise to figure what changes would result in interest formulas, what simplifications would be introduced in banking and everyday computations if such calendar reform became possible.

EQUIPMENT

E. 6—*Magic Numbers*
The Samco Company; Post Office Box 7755; Kansas City 3, Missouri
Card game: 45 number cards, two special cards, rule book; Single set—$1.25, double set $2, special rates to educators.

Description: There are forty-five number cards arranged in five suits which have eleven cards in each of four and one card in the fifth suit. This last suit also has a "magic number card" in it, and there is a special "Samco" card which belongs to no suit. The suits are distinguished by different colors and special symbols. The number cards contain all number combinations from 1–1, 1–2, 1–3, etc. up to 7–8, 7–9, 8–8, 8–9, and 9–9 together with certain "product" numbers in the center of the cards. The rule booklet is very complete and contains descriptions of thirty-five different games as well as suggestions concerning the educational use of the cards. The games require addition, subtraction, multiplication, and division of the forty-five basic number combinations and sometimes more than one of these operations.

Appraisal: The cards are very well made and beautifully printed. The inventor is conscious of the need for drill in the fundamentals of arithmetic, and who can deny that drill in the form of games is always more acceptable. The types of games are carefully graded from easy color matching to complicated multiple-operation arithmetic. For individual and small-group work the games are extremely useful; for large classes they can be used only as old-style flash cards and are not large enough for that. They would make good gifts, by parents or others, to children who need computation drill but who find it difficult to stick to it.

FILMS

F. 21—*What is Money*
Coronet Instructional Films; Coronet Building, Chicago 1, Illinois
Collaborator: Paul L. Salsgiver
16 mm. sound film; 1 reel; black and white —$45; color—$90.

Content: Shows the travel of a five-dollar bill as it is used to pay for services

and goods in nine different business transactions such ast he paying for gasoline, cashing a check, and paying an electrician's wages. The five-dollar bill finally returns to Tom who was the first person to use it. During the exchange of this bill, the film shows the evolution of present monetary standards from primitive barter, explains what money is, and why and how it meets an economy's needs.

Appraisal: This film covers content that is fundamental to an understanding of the function of money. The business transactions are all everyday adult affairs but could have had added interest if they had been purchases or services more closely related to the activities of youth. The film does a good job of showing the development and importance of money as a medium of exchange even though the pictures and comments are brief. It is a film that will add interest and understanding to the teaching of a complex subject.

Technical Qualities: Photography: Good. Sound: Good. Commentary: Excellent. Level: Junior high school.

F. 22—*Parts of Nine*
Young America Film, Inc.; 18 East 41st Street, New York 17, New York
Advisors: Wm. A. Brownell and Laura K. Eads
16 mm sound film; 1 reel; black and white —$38.50; 1947.

Content: Peter, a seven-year old boy, is shown preparing for his birthday party to which he has invited eight of his friends. He counts and arranges some of the things he will need for the party; namely, 9 hats, 9 favors, 9 plates, 9 cups, and 9 balloons. As he arranges each of these, various addition and subtraction combinations are developed through animation. The meaning of addition as an increasing process, of subtraction as a diminishing process, and the various groupings in 9 are illustrated. Addition and subtraction are developed in relation to each other for each combination in 9. For example, 6 and 3; 3 and 6; 9 take away 3; and 9 take away 6 are all developed in the same sequence.

Appraisal: This film is designed to help the young child understand the composition of the number 9; to indicate some of the uses of 9 in experiences of young children; to reveal relationships of 9 to other single-digit numbers. This is done by an effective combination of real pictures and animated drawings. The party situation should be interesting and meaningful to first and second grade children. Obviously the film should not be used before the child is able to count to 10 and should not supplant the use of objective materials to discover the groupings involved in 9. It is a film that can be used in teacher training to show procedures for making number meaningful. Teacher's guide is included.

Technical Qualities: Photography: good. Weak backgrounds. Commentary: Slow and appropriate for young children. Level: Grades 1–2. Content: Very good.

F. 23—*Time—The Servant of Man*
Modern Talking Picture Service, 9 Rockefeller Plaza, New York 20, N. Y.
16 mm. sound film; 1 reel, 20 min.; black and white; free

Content: This film shows the progress in the measurement of time from the sundials of the ancients to the modern watch. Early devices include water clocks, shadow clocks, sundials, candle clocks, hour glasses, and tower clocks. Animated drawings portray the relationship of astronomy to the measurement of time; the cause of day and night; the difference between the solar and sidereal day; the laws of the pendulum. Finally it shows how modern astronomical observatories control our modern time pieces to schedule accurately our daily life. The importance of measuring time and its service to man is presented in the closing scenes.

Appraisal: Although this film is sponsored by the Elgin National Watch Company, it is free of advertising. It has commentary and photography that maintains

interest while developing an understanding of the meaning of time and its measurement. The film contains such a variety of material that it is usable in social studies or general science classes as well as mathematics classes. It will be welcomed by mathematics teachers who wish enrichment material and wish to show the relationship of mathematics topics to other subject matter areas.

Technical Qualities: Photography: Very good. Content: Excellent. Commentary: Clear and Interesting.

F.24—*Properties of Triangles*
Knowledge Builders; 625 Madison Avenue, New York, New York. 16 mm. sound film; 1 reel; black and white; $40; 1947.

Content: By means of animated drawings and linkages, this film shows the properties of triangles such as rigidity, sum of the angles and concurrency of lines related to triangles. The rigidity of a triangle is shown to depend on the fact that only one triangle can be formed from three given sides. The concurrency of the angle bisectors, perpendicular bisectors, altitudes, and medians is illustrated by actual construction of these lines. The points of intersection are located with respect to sides and angles by measurement. The use of these points for drawing an inscribed or circumscribed circle is demonstrated.

Appraisal: This film should assist the student in seeing the relationships between different properties of triangles. Since it contains material in a sequence different from what is found in the usual geometry textbook, it will probably be most useful as an introduction to concurrency in triangles or as a review. Although the drawings in the film are more accurately and quickly drawn than a blackboard drawing by a teacher in the classroom, they are very similar to the drawings found in textbooks and on blackboards. In constructing lines such as the angle bisectors, the swinging of the arcs are not shown in the film. As in most mathematics films, this one fails to show applications of the principles and concepts covered. For example, the center of gravity is not even mentioned in the presentation of the point of intersection of the medians of a triangle.

Technical Qualities: Photography: Very good animated drawings. Sound: Excellent commentary. Content: Very good except for the ommission of applications.

FILM-STRIPS

F.S. 26—*What Numbers Mean*
F.S. 27—*Zero, a Place Holder*
F.S. 28—*A Number Family in Addition*
F.S. 29—*Compound Subtraction*
F.S. 30—*The Threes*
F.S. 31—*The Twos in Division*
Popular Science Publishing Company, 353 Fourth Avenue, New York. Film-Strips; 35 mm.; 6 film-strips; color; $30 for set of 6 Slides: Fifty 2×2; color—$25; 1947.

Content of F.S. 26: This film-strip pictures objects and animals to illustrate the meaning of the numbers from one to ten. For example, the number seven is pictured as representing seven chickens or seven blocks. As a review, pictures of objects are matched with the proper arabic number.

Content of F.S. 27: Zero as a place holder is illustrated in this film-strip by using coins and packs of cards to represent multiples of ten. A card holder with a tens section and a units section shows the meaning of the deciles and all numbers up to 100. For example, three packs of ten cards each in the tens section represent the number thirty. Similarly a block with holes for pegs to represent tens and units and an abacus further relates zero to its role as a place holder.

Content of F.S. 28: A birthday party furnishes the setting and the objects to illustrate the combinations that equal seven. The seven children, balloons, hats, candles, and cake pieces are grouped in various ways to show the different combinations that add to seven. Other problems adding to seven are illustrated by pictures

of birds, rabbits, coins, apples, planes and marbles.

Content of F.S. 29: Principles of subtraction are illustrated by using tickets for a third grade puppet show. There are 64 tickets and each of 28 pupils receives one ticket. By having the tickets in bundles of 10 the problem 64 minus 28 shows that borrowing from the bundles of ten gives ten ones. This subtraction is then made in the usual written column order and the strip ends by showing how to do the borrowing mentally.

Content of F.S. 30: This film-strip builds the threes' multiplication table by illustrating sums of three equal groups. For example, the number of legs on three dogs pictures the problems $4+4+4=12$ or $3\times4=12$. Similarly stamps, wheels, dots, fingers, cookies, soldiers, eggs, and beads are used to illustrate other combinations. As a summary, each entry in the threes' table is illustrated by combinations of dots.

Content of F.S. 31: Preparing for a picnic furnishes the setting for comparing quantities grouped into twos. By comparing groups of twos of objects such as sandwiches, rabbits, oranges, the meaning of division is illustrated. For example, three groups of rabbits with two rabbits in each group giving a total of six rabbits illustrates the problem $6\div2=3$. Similarly, simple long division is illustrated by pictures such as two balloons for each of seven boys gives fourteen balloons.

Appraisal of F.S. 26–F.S. 31: These Teach-O-Film-strips will furnish the teacher with many illustrations for the development of meaningful number concepts that are fundamental to the beginning pupil. Besides giving the pupil concrete examples of basic principles of computation, the settings are appropriate and will furnish the teacher with ideas for pupil activities with concrete objects in the classroom. The situations and objects pictured are closely related to the life of children but might be more interesting if they were photographs of real people, animals or objects rather than drawings. An excellent teaching guide accompanies the film-strip.

Technical Qualities: Photography: Colorful drawings. Content: Very appropriate. Level: First–third grade.

F.S. 32–42—*A Study of Fractions*

Photo and Sound Productions; 116 Natoma Street, San Francisco, California. Author: O. W. McGuire

Film-strips; 35 mm.; 11 film-strips; 25 frames per strip; black and white—$33.25 for entire set including 25 tests, key and teacher's guides; 1946.

F.S. 32—*Units and Fractional Parts*
F.S. 33—*Multiple Fractions—Numerator and Denominator*
F.S. 34—*Comparing Fractions—Adding and Subtracting*
F.S. 35—*Multiple Fractions—Improper Fractions*
F.S. 36—*Improper Fractions (cont.)—Mixed Numbers*
F.S. 37—*Reducing and Changing Fractions*
F.S. 38—*Changing Fractions to a Common Denominator—Part a*
F.S. 39—*Changing Fractions to a Common Denominator—Part b*
F.S. 40—*Multiplying Fractions*
F.S. 41—*Dividing Fractions*
F.S. 42—*Reciprocals—The Rule of Division*

Content of F.S. 32–F.S. 42: This series of film-strips uses drawings and pictures of objects such as apples, pies, circles or rectangles to instill mental pictures of the meaning of fractions and operations with fractions. Illustrations such as inches in a foot and days in a week are used to show the need and use of fractions for comparison but the series as a whole has too few applications. The basic operations with fractions are illustrated so that the pupil will understand the reason behind the development of rules. However, the rules are then stated in language that is often formal and complex instead of permitting the

pupil to think in concrete terms. Sometimes the rules are stated prior to their development by illustration.

Appraisal of F.S. 32–F.S. 42: This series of film-strips should make it possible to cover much material in a short time and thus be usable for review or remedial instruction. In addition, the teaching guide and test sheets should provide the teacher with materials and directions so that the set will be used effectively.

Technical Qualities: Photography: Average. Needs color to add interest. Content: Fair. Vocabulary often complex for elementary grades. Level: Grades 5–8.

PICTURES

P. 3—*Stereographs in Solid Geometry*
Keystone View Company, Meadville, Pennsylvania
Stereopticon pictures; 50 views; black and white drawings—$15

Description: This set of fifty stereographs is made up of drawings of the propositions included in modern high-school textbooks in solid geometry. On the back of each stereograph is printed the proposition or proposition together with corollaries and formula covered by the drawing. Propositions are included from these subjects: Lines and Planes in Space, Polyhedrons, Cylinders and Cones, and The Sphere.

Appraisal: One of the greatest difficulties in teaching Solid Geometry is the visualization of the third dimension from drawings. These stereographs, when viewed through a stereoscope, show the third dimension very clearly and thus greatly aid in understanding the properties of line, curve, or solid in space in relation to its three coordinate planes. The drawings are accurate and clear on dark backgrounds and show immediately the relation between a two-dimensional drawing and its appearance in three dimensions. One great disadvantage of these stereographs is that they can be viewed by only one student at a time. Whether or not they are better than models or vectographs is open to question. In any case, the increased interest in and understanding of geometric relations that is likely to result from the use of these stereographs should justify their purchase.

SOURCES OF MATERIAL FOR LABORATORY WORK

SL. 5—*Teacher's Guide for Monroe Calculator*
Monroe Calculating Machine Company; Orange, New Jersey
Booklet and other material; $8\frac{1}{2}'' \times 11''$, 19 pages.

Description: Upon request the Monroe Company will send the teacher's manual which describes the Educator Model and gives examples of demonstrations for teaching addition, subtraction, multiplication, and division. They tell the teacher, in parallel columns, what to say and what to do. There are also fundamental instruction cards printed on heavy paper for each of these operations; these can be obtained with or without test questions on the back of the sheet. Another booklet, with a higher percentage of advertising (32 pages; $7'' \times 10\frac{1}{2}''$), entitled "Teaching Mathematics with the Monroe Educator" includes: reasons for using machine work in schools, directions and practice examples, reprints of articles and letters describing their use, and some pictures.

Appraisal: Machine computation is certainly necessary in business mathematics courses until high skill is attained. In other mathematics courses there is some justification for demonstrating simple procedures and having the pupils carry out the operations to the point of understanding. It is very doubtful whether all should be subjected to the amount of drill necessary for competence in the use of machines. For situations where machine computation should be taught, Monroe has made available very attractive and interesting aids to teaching. Since they are definitely designed to describe a low-price model, they should find favor with schools.

◆ THE ART OF TEACHING ◆

Individual Instruction in College Algebra

By J. E. Danieley
Elon College, North Carolina

There is no method of instruction which is a panacea for all of the ills in teaching college algebra. In any classroom there are four or more variables which enter into the effectiveness of the learning situation: (1) the physical environment, (2) the class, (3) the subject, and (4) the teacher. As any one of these conditions varies, the method must also be varied if the teaching is to be most effective.

It has become more or less convention that in many college classes the teacher lectures to his students. For some subjects this method can be effective, but in the teaching of algebra, its effectiveness is doubtful. The understanding of quadratic equations, exponents and radicals or progressions is not brought about by even the most intellectual of lectures. An attempt to teach algebra by the lecture method is, for the most part, a waste of time for the teacher and for the student. Algebra is learned by doing, not by listening to someone tell how it should be done. It is not conceivable that all of the students in any given college algebra class will have either the same ability or preparation. Therefore, any successful method of instruction must, of necessity, provide for these individual differences.

Some of the objectives for a course in college algebra are:

1. *To begin with the students regardless of their previous training and to teach them as much algebra as possible.*
2. *To provide for the individual progress of* each *and* every *student according to his ability and initiative.*
3. *To encourage independent study and to develop a sense of responsibility and self-reliance.*
4. *To develop a sense of satisfaction in the accomplishment of a given task.*
5. *To prepare as many as possible for the further study of mathematics.*
6. *To plan the activities of the class period so as to save time and effort for the teacher and the student.*
7. *To give to those who are interested and capable something more than the "bare minimum", and to allow the student to select, with teacher-guidance, topics to be studied beyond the required work.*
8. *To reduce the number of students failing the course to a minimum.*
9. *To make teaching an activity of stimulation and guidance, with students being assisted in their work.*
10. *To give to each member of the class something* worthwhile *to do during the entire period, not as a matter of keeping him busy but in order to accomplish the desired goals.*
11. *To develop student interest in algebra, and to help the students to see the importance and advantages of purposeful practice.*

It is the thesis of this writer that these and other objectives can best be attained in many instances by using some form of individual instruction. It would seem impossible to give such instruction to all of the members of a class of thirty or more in the same length of time that is normally used for class instruction. Such, however, is not the case.

There are certain conditions which must be met if the plan is to operate successfully. As has already been mentioned the class, the subject, the teacher and the physical environment must all be such as to offer no serious problem to the operation of this method. In addition to these four variables, the textbook which is used must be clearly written and the type problems must be thoroughly explained. It is also necessary for the teacher to indicate the amount of work which is required of all students who are to receive

credit for the course. This can probably best be done by using a mimeographed sheet of assignments so that the student knows exactly what he has to do. The work must be so organized that each student is free to work at his own rate. Each student may do as many assignments in a given period as he wishes to do. This gives to each student the opportunity to progress at the rate which he desires and of which he is capable.

There are several methods by which the necessary assistance may be given to those students who have difficulties:

1. It is possible in some classes which are small for the teacher to give all of the assistance needed. This plan works well under certain conditions, but even when it is administratively practical, it is not always the most desirable for the class.
2. In some cases it is advisable to have a seating arrangement which leaves a vacant seat next to each student. Under teacher-guidance the students are at liberty to move around the room during the class hour and work with others who are capable of assisting them with their difficulties. This method works well if there is a sufficient number of seats and if they are so arranged that the students can work together without unnecessary disturbance to the other members of the class.
3. Where there are insufficient seats it is possible, after some observation, to make a seating arrangement which places the more capable students next to those who have had insufficient preparation and in this way those who are capable can render assistance to those who may need it.
4. Another plan which seems very desirable under some circumstances is to select four or five of the most capable students and to allow them to assist by going to the desk of the student who is experiencing difficulty and answering his question or explaining the problem to him. The teacher must guard against using these students so much that they will not find time for their own work. Each of these plans offers advantages under different circumstances. Only a person familiar with the conditions in a particular situation can determine which plan should be used.

Testing is the greatest problem to be solved in connection with this method of instruction. Tests should be given at regular intervals to determine whether or not the students are able to work problems similar to those they have worked in their assignments. Such tests should include only the type of problem which has been practiced by each student. This necessitates the giving of several tests. It is possible to divided the class, for testing purposes *only*, into four or five groups and to give a different test to the students in each group according to the amount of work which they have successfully completed.

The following concluding statements can be made regarding individual instruction in algebra on the college level.[1]

1. Because of greater individual differences, individual instruction offers even greater advantages on the college level than it does in the elementary or secondary schools.

2. The learning of algebra is an individual process which is accomplished only by doing. Individual instruction is the most economical way of having all of the students *do* their maximum.

3. The number of students failing to do satisfactory work under this plan is much lower than under the plan of class instruction. Not only this, but the grades of a majority of the students are higher.[2]

4. This plan provides for individual differences in that the student begins work regardless of previous preparation and progresses at the rate which he desires and of which he is capable.

5. This plan places on each student a definite responsibility for doing a specified amount of work, and gives opportunity to those who are

[1] These conclusions are results of an experiment conducted in a class of college algebra taught by the writer during the fall quarter of the school year 1947–48 in Elon College.

[2] Under controlled conditions in the writer's experiment, sixty-six per cent of the grades were higher under this plan of individual instruction than under other conventional methods used.

capable to do much more, and to do that under teacher-guidance.

6. Every member of the class has something worthwhile to do all of the time. All of the student's work can have purpose and no one is held up who is capable of doing more advanced work.

7. The using of more capable students to assist those students who have difficulty gives to them an almost invaluable experience and presents to them a challenge which they enthusiastically accept.

8. Teacher-student relationships are much more pleasant, and the teacher is able to better serve as a guide and counselor to the students.

9. Student interest is greater in that the more capable are challenged to do more work, and those who do not have the necessary background are not forced to listen to discussions which they are unable to comprehend.

10. The majority of the students are better prepared for further study of mathematics. They accomplish more in the course and more important than that is the fact that much of it is done on their own initiative.

11. This method is not desirable in all classes. Its desirability and practicability must be determined by the teacher who is familiar with the conditions under which the plan must operate.

EDITORIALS

W. S. Schlauch

THE MATHEMATICS TEACHER as well as the National Council of Teachers of Mathematics delights in honoring Dr. W. S. Schlauch who was recently elected honorary president of the Council. He has served the cause of mathematics long and well. He has been a most inspiring and efficient teacher, scores of students having come under his wholesome influence for many years past. Moreover to many of us he has been a pleasant companion and trusted friend. Readers who have not been so fortunate as to know Dr. Schlauch as Associate Editor of THE TEACHER, as a member of the Board of Directors of the Council for many years, or as a friend will find his autobiography (in this issue) of interest. We all wish Dr. Schlauch many more years of useful service and happiness, so that we can continue to have his wise counsel. We gladly dedicate this number to Dr. Schlauch in appreciation of his long and useful service in the cause of mathematics.—W.D.R.

The Twentieth Yearbook

READERS of THE MATHEMATICS TEACHER will be interested in three letters which have recently been received from three people, two of whom are contributors to the Twentieth Yearbook, which has recently come off the press. They follow:

1.

"Radbourne"
Ollerbarrow Road,
Hale,
Cheshire,
September 8, 1948

Would you please accept my grateful thanks for the copy of the Twentieth Yearbook of the National Council of Teachers of Mathematics. This book of some 300 pages reflects very great credit on the work done by Mr. J. T. Johnson and his colleagues on the Committee on the Metric System of Weights and Measures and I beg you to convey my sincere congratulations to them.

This book contains so much evidence in favour of the use of the already legalised metric system as the universal language of quantity that we may well ask ourselves why the Governments of the U. S. America and the United Kingdom have hitherto refrained from exercising their power to attain that object which would be of special benefit to themselves as the Nations most concerned in the development of international trade.

The most effective course would be for the Governments of America and Britain to take joint action but if this should prove impracticable we must then consider which of these Governments could most effectively take the initiative in the confident belief that the other would quickly follow to avoid isolation.

The honour of leading the way appears to rest upon the Government of U. S. America for the following reasons:

1. The prolonged use by Americans of a decimal system of coinage has served to inculcate the decimal method of reckoning and as the metric system is a decimal system of weights and measures this facility would be of great value. The United Kingdom has not yet adopted decimal coinage.
2. The immigration into America of some millions of people from Continental Europe indicates that a large section of the American population is already familiar with the practical use of the metric system.
3. As all the South American Republics employ the metric system the general policy of Pan America would be promoted.
4. The American outlook is considered to be less hidebound by tradition than that of the United Kingdom and it is frequently said that Americans display a greater readiness to study the convenience of their customers in foreign countries who all now use the metric system.

As Chairman of the Executive Council of the Decimal Association in London I would like to be kept in touch with the American progress and if you could send me a few additional copies of your book I will arrange for them to be distributed in the most effective quarters amongst Government Departments and the leading Commercial and Industrial organisations.

Yours faithfully,
HARRY ALLCOCK

2.

Chicago, Ill.
August 30, 1948

Today there came to me through the mail a copy of "The Metric System of Weights and Measures," published by the committee of which you are chairman. Permit me to thank you for this book, which is a valued addition to my shelves.

Since we had our last correspondence, I have continued to use the International System, just as since 1911, when I got out of the woods of unrelated units. I value this world system even more now than ever.

What is the present status of the desire to have the metric system used generally in the United States? From time to time I have thought that some political party would make a name for itself, but it seems that they do not work along such lines.

With my best wishes to you, I am

Yours truly,
ARTHUR BESSEY SMITH
Vice President, Automatic Electrical Laboratories, Inc.

3.

Squanset
Point Pleasant, N. J.
August 21, 1948

I wish to thank you most heartily for the copy of the Twentieth Yearbook on the Metri System of Weights and Measures which was received today. It was with considerable surprise that I saw my article from the *American Machinist*, as I had completely forgotten the correspondence regarding its publication.

I am glad to note the article by my good friend Theodore Miller, and shall enjoy reading the whole book as time permits.

While I have felt for many years that a decimal system had many advantages, as in our currency, the changing of our basic unit, and the cost of the change in our thousands of tools and dies, have made it seem unwise in the past, the growing use of metric dimensions by the automotive industry and others indicates that the change is not impossible, nor prohibitive as to cost.

Again thanking you, I am

Sincerely,
FRED H. COLVIN

These letters all show the present interest in having something done about a wider use of the Metric System in this country. —W.D.R.

Guidance in Mathematics

READERS of THE MATHEMATICS TEACHER will be interested to see a pamphlet which was recently sent to THE TEACHER by Professor Cleon C. Richtmeyer. Chairman of the Committee on High School Mathematics of the Michigan Section of the Mathematical Association of America. Professor Richtmeyer is at Central Michigan College of Education at Mt. Pleasant, Michigan.

The pamphlet is entitled "A Mathematics Student—To Be or Not to Be?" In the first place it gives a very interesting pictorial chart showing "How High School Mathematics Can Contribute to Your Career." It then goes on to discuss cases of students who when it was too late discovered that they were too deficient in mathematics to carry on the type of life work they had chosen. Then follows a long list of courses and programs which require some background of high school mathematics. It begins to look as if the idea is beginning to spread that students must be more careful in choosing basic high school mathematics as preparation for future work.—W.D.R.

Correction

In an editorial on page 287 of the October issue of THE MATHEMATICS TEACHER we said that the new president of the National Council of Teachers of Mathematics Dr. E. H. C. Hildebrandt was "a member of the American Mathematical Society of which he has been on the Board of Governors since 1947." He is a member of the Society, but is not on their Board of Governors. However he is a member of the Mathematical Association of America and he has been on their Board of Governors since 1947. We are sorry for the error but are glad to correct it.—W.D.R.

IN OTHER PERIODICALS

By NATHAN LAZAR

Midwood High School, Brooklyn 10, New York

Miscellaneous.

1. Arithmetic at San Francisco City College. *California Journal of Secondary Education.* 23: 304–305, May 1948.
2. Brennecke, C. G., "Correlation of Mathematics and Electrical Engineering Courses." *Journal of Engineering Education,* 38: 358–365, Jan. 1948.
3. Burkholder, M., "Arithmetic Is Fun." *American Childhood,* 33: 16–17, June 1948; 34: 20–21, September 1948.
4. Buswell, G. T., "Scholarship in Elementary-School Teaching." *Elementary School Journal,* 48: 242–244, January 1948.
5. Cooke, R. J., "How We May Help the Beginning Child in Arithmetic." *Grade Teacher* 65: 34+, April 1948.
6. Danieley, J. E., "Individual Differences and the Teaching of Algebra." *High School Journal,* 31: 69–72, March 1948.
7. Hartung, M. L., "Indictment of Science and Mathematics Teaching." *School Review,* 56: 319–321, June 1948.
8. Hartung, M. L., "Selected References on Secondary-School Instruction." *School Review,* 56: 114–115, February 1948.
9. Hazelhurst, T. H., "Anglo Mathematics." *Journal of Chemical Education,* 25: 353–357, June 1948.
10. Hughes, J. A., "New Arithmetic Curriculum." *Minnesota Journal of Education,* 28: 275–276+, February 1948.
11. Johnson, J. T., "Are Ratios Fractions?" *Elementary School Journal,* 48: 374–378, March 1948.
12. Kilbridge, J. T., "How Different are the Several Objectives of a Course of Study in Mathematics?" *College and University,* 23: 201–11, January 1948.
13. Kinzer, J. R., and Kinzer, L. G., "College Chemistry Students Deficient in Arithmetic; Academic Data." *Educational Research Bulletin,* 27: 8–10+, January 1948.
14. Lichtenstein, S., "Enrichment of Mathematics in Junior High School." *High Points,* 30: 79–80, April 1948.
15. Materials for Instruction in Arithmetic." *Childhood Education,* 24: 372–373, April 1948.
16. McLatchy, J. H., "Child's Thinking as a Source of Error." *Educational Research Bulletin,* 27: 113–20, May 1948.
17. Morton, R. L., "Reteaching Versus Drill in Arithmetic." *Journal of Business Education,* 23: 23–24, June 1948.
18. Moser, H. E., "Advancing Arithmetic Readiness Through Meaningful Number Experiences." *Childhood Education,* 24: 322–326, March 1948.
19. Nadler, M., "Integrating Mathematics and Industrial Arts." *Industrial Arts and Vocational Education,* 37: 215–218, June 1948.
20. Parry, M. E., "Ready-to-use Tests for Middle and Upper Grades; Solving Problems." *Instructor,* 57: 23, May 1948.
21. Peary, K. B., "Arithmetic and Life Experiences with Special Help for Slow Learners." *The Grade Teacher,* 65: 94–95, March 1948.
22. Polishook, W. M., "Business Arithmetic, Alone or Integrated?" 28: 492–3, April 1948.
23. Schloring, R., "Mathematics, Grades One to Twelve." *Science Teacher,* 15: 59–60+, April 1948.
24. Sperks, M. W., "Social Uses of Arithmetic." *Chicago Schools Journal,* 29: 75–78, January 1948.
25. Vedova, G. C., "Role of Mathematics in the Teaching of an Engineer." *Journal of Engineering Education,* 38: 727–731, June 1948.
26. Wilson, G. M., "Social Utility Theory as Applied to Arithmetic, its Research Basis, and some of its Implications." *Journal of Educational Research,* 41: 321–337, January 1948.
27. Wilson, M. B., "Real-Life Number Experiences." *Instructor,* 57: 20+, May 1948.

NEW BOOKS

1. Archibald, Raymond Clare, *Mathematical Table Makers—Portraits, Paintings, Busts, Monuments, Bio-Bibliographical Notes.* Pub. Scripta Mathematica, Yeshiva University, New York, 1948. 82 pp. $2.00.
2. Blackhurst, J. Herbert, *Euclidean Geometry, Its Nature and Its Use.* Garner Publishing Co., Desmoines, Iowa, 1947. 208 pp.
3. Bliss, Gilbert A., *Lectures on the Calculus of Variations.* University of Chicago Press, Chicago, Ill., 1946. 296 pp. $5.00.
4. Boeker, Mary Draper, *The Status of the Beginning Calculus Students in Pre-Calculus College Mathematics.* Bureau of Publications, Teachers College, Columbia University, New York, 1947. 83 pp. $2.15.
5. Britton, Jack R., and Snively, L. Clifton, *Algebra for College Students.* Rinehart & Co., Inc., New York, 1947. 529 pp., $3.00.
6. Civil Aeronautics Administration—Haefner, Ralph (Director of the Project), *Teaching Aeronautics in High Schools.* McGraw-Hill Book Co. Inc., New York, 1947. 419 pp. $3.50.
7. Clements, Guy Roger, and Wilson, Levi Thomas, *Manual of Mathematics and Mechanics.* Second Edition. McGraw-Hill Book Co., Inc., New York, 1947. 349 pp.
8. Curtiss, David Raymond, and Moulton, Elton James, *Essentials of Analytic Geometry.* D. C. Heath & Co., Boston, 1947. 259 pp.
9. Ferrar, W. L., *Higher Algebra for Schools.* Oxford University Press, New York, 1945. 214 pp. $3.75.
10. Griffiths, Lois Wilfred, *Introduction to the Theory of Equations.* Second Edition. John Wiley & Sons, Inc., New York, 1947. 278 pp. $3.50.
11. Hart, Walter W., *A First Course in Algebra.* D. C. Heath & Co., Boston, 1947. 389 pp.
12. Hart, Walter W., *A Second Course in Algebra.* D. C. Heath & Co., Boston, 1947, 373 pp.
13. Hart, Walter W., and Jahn, Lora D., *Mathematics in Action, Book Three. Second Edition.* D. C. Heath & Co., Boston, 1947. 438 pp. $1.52.
14. Hart, William L., *Brief College Algebra.* Revised Edition. D. C. Heath & Co., Boston 1947. 332 pp. $2.75.
15. Hart, William L., *Introduction to College Algebra.* Revised Edition. D. C. Heath & Co., Boston, 1947. 312 pp.
16. Heineman, E. Richard, *College Algebra.* The Macmillan Co., New York, 1947. 359 pp. $3.25.
17. Hoffmann, Banesh, *The Strange Story of the Quantum.* Harper & Bros., New York, 1947. 239 pp. $3.00.
18. Kells, Lyman M., *Elementary Differential Equations.* Third Edition. McGraw-Hill Book Co., Inc., New York, 1947. 312 pp. $3.00.
19. Luthringer, George Francis, Chandler, Lester Vernon, Cline, Denzel Cecil, *Money, Credit and Finance, Volume IV.* D. C. Heath & Co., Boston, 1947. 389 pp.
20. Mallory, Virgil S., Bolishook, William M., Chapman, Ivan E., and Starkey, S. Herbert Jr., *Commercial Arithmetic.* Benj. H. Sanborn & Co., Chicago, 1948. 510 pp.
21. Mason, Thomas E., and Hazard, Clifton T., *Brief Analytic Geometry.* Second Edition. Ginn & Co., Boston. 205 pp. $2.50.
22. Nowlan, Frederick S., *College Algebra.* First Edition. McGraw-Hill Book Co., Inc., New York, 1947. 371 pp. $3.00.
23. Ritt, Joseph Fels, *Integration in Finite Terms—Liouville's Theory of Elementary Methods.* Columbia University Press, New York, 1948. 100 pp. $2.75.
24. Ritt, Joseph Fels, *Theory of Functions.* Revised Edition. King's Crown Press, New York, 1947. 181 pp.
25. Robson, A., *An Introduction to Analytical Geometry.* Cambridge University Press, The Macmillan Co., New York, 1947. 215 pp.
26. Schorling, Raleigh, Clark, John R., and Lankford, Francis G. Jr., *Mathematics for the Consumer.* World Book Co., New York, 1947. 438 pp.
27. Schorling, Raleigh, Clark, John R., and Smith, Rolland R., *Modern-School Geometry.* New Edition. World Book Co., New York, 1948. 436 pp.
28. Sherwood, G. E. F., and Taylor, Angus E., *Calculus.* Revised Edition. Prentice-Hall Inc., New York, 1947. 568 pp.
29. Sisam, Charles H., *Concise Analytic Geometry.* Henry Holt & Co., New York, 1946. 155 pp. $2.00.
30. Smith, Edward S., Salkover, Meyer, and Justice, Howard K., *Unified Calculus.* John Wiley & Sons, Inc., New York, 1947. 534 pp. $3.50.
31. Sutherland, Ethel, *One-Step Problem Patterns and Their Relation to Problem Solving in Arithmetic.* Bureau of Publications, Teachers College, Columbia University, New York, 1947. 170 pp. $2.35.
32. Thomson, Sir George, *The Atom.* Third Edition. Oxford University Press, New York, 1947. 196 pp. $2.00.
33. Underwood, Ralph S., Nelson, Thomas R., and Selby, Samuel, *Intermediate Algebra.* The Macmillan Co., New York, 1947. 283 pp. $2.60.
34. Upton, Clifford B., and Fuller, Kenneth G., *Arithmetic, Grade Eight.* American Book Co., New York, 1947. 360 pp.

35. Van Voorhis, Walter R., and Topp, Chester W., *Fundamentals of Business Mathematics.* Prentice-Hall. Inc., New York, 1948. 454 pp. $3.75.
36. Williams, Kenneth P., *The Mathematical Theory of Finance.* Revised Edition. The Macmillan Co., New York, 1947. 274 pp.
37. Wise, John E., *The Nature of the Liberal Arts.* Bruce Publishing Co., Milwaukee, 1947. 225 pp. $3.50.
38. Yates, Lt. Col. Robert C., *Curves.* Prepared for use in the Department of Mathematics, U. S. Military Academy. 1946. 230 pp.

Preliminary Announcement of the Twenty-Seventh Annual Meeting of The National Council of Teachers of Mathematics Baltimore, Maryland March 31, April 1 and 2, 1949

The Twenty-Seventh Annual Meeting of the National Council of Teachers of Mathematics will be held at Baltimore, Maryland, on Thursday, Friday and Saturday, March 31, April 1 and 2, 1949. Headquarters will be at the Lord Baltimore Hotel, Baltimore and Hanover Streets, and all meetings will be held there. The complete program of speakers will appear in an early issue of THE MATHEMATICS TEACHER.

Rooms at the Lord Baltimore Hotel may be reserved by writing directly to the hotel management. Rates for rooms are as follows: Single, $4.00 to $8.00; Double with double beds, $6.50 to $10.50; Double with twin beds, $7.50 to $10.50.

Miss Agnes Herbert, Maryland State Representative, is the Local Chairman for this meeting. Further information may be obtained by writing to her at Clifton Park Junior High School, Baltimore 18, Maryland.

BOOK REVIEWS

Mathematics, Our Great Heritage. Essays on the Nature and Cultural Significance of Mathematics. Selected and Edited by William L. Schaaf. Harper and Brothers, New York, 1948. xi+291 pages, $3.50.

It is the ambition of all great teachers to have others share with them the joy, appreciation and value of the subject they teach. Mathematics teachers are no exception to this human urge. Down through the ages, many of the great teachers of mathematics have attempted to depict for the layman, in the layman's language, the mysteries, creations, abstractions, and beauty of the great science. This volume is a selection of essays by modern, outstanding teachers of mathematics, through which the editor hopes the reader will achieve enlightmenent on the nature and significance of mathematics.

The essays are grouped into five categories: mathematics as art; creativeness in, and development of mathematics; mathematics as an abstract structure; mathematics as a scientific tool; and the human value of mathematics. The names G. H. Hardy, Eric Temple Bell, George Sartan, Tobias Dantzig, Thornton C. Fry, Arnold Dresden, and Robert D. Carmichael, as some of the authors, will testify to the initiate the real scholarliness of the work. The successive articles are literary gems as well as revelations of mathematical spirits at work. The one page editorial preface to each essay is on the same high literary plane and tells clearly the nature and purpose of the material that follows.

To those who know mathematics, the reading of this book is added joy and a real assurance that their own appreciation of their subject is fully warranted. There is also added delight in the apparent disagreement of great mathematicians, historians, and teachers, on the primary purpose of mathematics, as the extension of knowledge for its own sake or as the knowledge created to satisfy human needs. To those who do not know mathematics, it is the reviewer's judgment that the going will prove difficult and like so many other endeavors of the same kind, leave the reader somewhat bewildered. It cannot fail, however, to portray the depth of feeling and scholarship of true mathematicians, and the great value and importance of mathematics in shaping human destiny. No teacher of mathematics, in the secondary or the collegiate field, should miss the dessert offered by this anthology.

The format of the book is good. There is an index, so useful and so frequently missing in books of this type. A number of errata will no doubt be eliminated on further printing. To the uninitiated, the equation on line 22, page 255, should read $a=b+c$.—HOWARD F. FEHR

*Surveying Instruments.** By Edmond R. Kiely. xii+411 pp. Illus. $3.00. Bur. of Pub., Teachers Coll., Columbia Univ. New York. 1947.

Seldom does a book such as *Surveying Instruments* find its way into the ranks of engineering and mathematics texts. The scholarly excellence of its presentation and documentation alone would have warranted its choice as the yearbook of the National Council of Teachers of Mathematics. Such perfection of presentation makes the history of surveying and its instruments doubly absorbing, even though the history of man's advances in the art of civil engineering as told by the author fascinates the reader in its own right.

Awareness of a code of ethics and adherence to it are counted the distinguishing marks of a professional man. Consciousness of such a status is gained chiefly through the justifiable pride of being a co-partner in a service to mankind that spans the centuries with its scholarly and applied wisdom carefully passed from hand to hand, with each participant striving to add to it. Lack of high ideals and moral stature in those who practice professions lower them to the level of devices used for personal gain. This book provides the spark that will build the fire of professional pride in those who study it.

The value of the book as a text is only heightened by the progressive development of surveying instruments such as the leveling rod, quadrant, theodolite, and the transit from their earliest beginnings in Egypt, China, and Babylonia down through the Greek, Roman, Medieval, and the Renaissance periods. One achieves a new viewpoint toward what otherwise become commonplace "tools of the trade."

A practical exposition on geometry in schools followed by a series of well-chosen and well-described exercises in the applications of geometry and trigonometry to simple surveying, completes the text.

In his thirty years of engineering, teaching, and professional experience, the reviewer has never encountered a book that he could recommend so wholeheartedly as "must" reading for all beginning engineering students, teachers of mathematics and the engineering profession at large.—EARL S. HANNAFORD, Long Lines Department, American Telephone and Telegraph Company, New York City.

* Quoted by permission from *The Scientific Monthly*, April 1948, pp. 347–348.

NEWS NOTES

THE NATIONAL COUNCIL OF TEACHERS OF MATHEMATICS ANNUAL CONVENTION
APRIL 2–3, 1948, INDIANAPOLIS, INDIANA

A Report from the Conferences on "Coordinating High School and College Mathematics."*

Presiding: H. W. Charlesworth, East High School, Denver, Colo.

The following resolutions were adopted:

1. The Conference Group of the National Council of Teachers of Mathematics welcomes the prospect of close cooperation with the Mathematical Association of America in the problem of improving the preparation of students who are planning to go to college.

2. The Conference Group notes with approval the organized efforts of classroom teachers of high school mathematics to improve their teaching. It affirms that all problems of high school curricula are matters of primary concern to classroom teachers; that groups of teachers have the right and the duty to take the initiative in proposing reforms in these matters; and that such groups must be consulted in all plans for changes in curricula.

The following statements and suggestions were made:

Dr. Aubrey J. Kempner, University of Colorado—Closer cooperation between the high schools and colleges is welcomed by The Mathematical Association of America. I am greatly impressed by the Guidance program in high school mathematics and recommend that it be extended to include the college area. (He was referring to the Guidance Pamphlet prepared by the National Council.)

Mrs. Gladys McColgin, Tudor Hall, Indianapolis recommended that the above resolutions be sent to the Board of Directors of the National Council. This met with the approval of the group.

Mr. G. H. Jamison, Kirksville, Miss., expressed the thought that high schools and colleges agree in the feeling that a strong foundation in mathematics be laid in the elementary grades; that we should get more elementary teachers interested in the National Council. This idea was endorsed by Mr. Sheldon Myers of Western Michigan College, Kalamazoo, Mich.

Miss Brookman, Ashland, Kentucky, suggested that we reach the elementary teachers through city superintendents.

Mr. Sheldon Myers also suggested that a comparative study of the mathematical education of foreign countries with that in our country would be of great value, since foreign students entering our universities and colleges seem to be so well prepared.

Dr. Bjame Ullswick, Illinois State Normal University, expressed the opinion that colleges should accept the more liberal courses now offered in most high schools rather than limiting their credits to algebra and geometry. Dr. Kempner pointed out the distinction between general math. and unified math. The latter, he said, is acceptable to the college, but the former as taught in Colorado is not.

Dr. Bradfield, Chicago, brought out the idea that teaching classes in general mathematics requires special training on the part of the teacher. He suggested that the National council take the initiative in forming a unified program in the training of teachers of these courses.

Mr. Carpenter, Los Angeles, suggested that the National Council might assume the responsibility of forming a coordinating committee to report the action taken by mathematics meetings in various parts of the country.

Dr. E. H. C. Hildebrandt, Northwestern University, Evanston, Ill., newly elected president of the National Council, expressed the fact that the National Council is vastly interested in this problem and would welcome suggestions from teachers from both high school and college. He pointed out that the cooperation of both teachers and administrators would be needed. He showed himself interested in the problem and perfectly willing and anxious that the National Council should do all in its power to help.

There was considerable discussion on the on the matter of how to inform principals and administrators of our interests, attitudes and work.

There were a number of principals present at the conferences.

Respectfully submitted.
(Signed) MAMIE L. AUERBACH†
Secretary of the Conference

Resolutions Adopted at the Business Session, April 3, 1948

Be it Resolved:

First, that the membership of the N.C.T.M. commends the Mathematical Association of America in its recent adoption of resolutions stating their desire for close cooperation with The National Council of Teachers of Mathematics in the efforts of both organizations to improve the coordination of high school and college mathematics and its teaching.

Second, that the membership of the N.C.T.M. approves and commends the efforts and action already taken by its own Board of Directors relative to the matter.

Third, that the membership of the N.C.T.M. hereby pledges itself to support and help the Board of Directors in its further efforts of closer cooperation with all groups interested in this situation.

The Illinois State Normal University Conference on the Teaching of Elementary and Secondary Mathematics was held at Normal, Illinois on Saturday April 17, 1948.

* *Note:* Two conferences were held, one on April 2, 7 to 8 P.M. and one on April 3, 4:00 to 5:15 P.N.

† Miss Auerbach is Chairman of the Mathematics Department of John Marshall High School Richmond, Virginia.

ELEMENTARY SECTION

All Meetings in Metcalf Building

9:15 A.M. *General Meeting*—University High Library, Dr. C. N. Mills, I.S.N.U., Leader.

Speaker: Miss Mary Potter, Supervisor of Mathematics for Public Schools of Racine, Wisconsin, "The Teaching of Meaningful vs. the Teaching of Mechanistic Arithmetic."

Panel Discussion:

Miss Mary Arnold, Metcalf Campus School, "Pupil Experiences to Enrich Appreciation and Understanding."

Dr. Huberta Clemans, Metcalf Campus School, "Getting Meaning Attached to Manipulative Operations."

Miss Ethel Stein, Metcalf Campus School, "Development of Ability to Solve Verbal Problems."

11:15 A.M. *Discussion Groups*—Metcalf Campus School.

PRIMARY—Room T103

Miss Ruth Cole, Metcalf Campus School, Leader

Speakers: Miss Alice Rachel Miller, Central School, Pontiac, Illinois, "Materials and Suggestions for Meaningful Primary Arithmetic."

Mrs. Nelle Steele, Sheep Eye School, McLean County, "Rural Teachers Concept of Teaching Primary Arithmetic."

INTERMEDIATE—Room T203

Miss Christine Thoene, Metcalf Campus School, Leader

Speakers: Mrs. Dorothy Miller, Washington School, Bloomington, Illinois, "Problems of Teaching Arithmetic in the Intermediate Grades."

Mrs. Vera Martin, Central School, Normal, "Introduction and Meaning of Fractions."

UPPER GRADES—Room T206

Miss Lorle Dean, Metcalf Campus School, Leader

Speakers: Miss Lola Brown, Junior High School, Riverside, Illinois, "Consumer Arithmetic in the Upper Grades."

Miss Inabell Trueblood, Junior High School, Decatur, Illinois, "Individualization of Arithmetic."

1:45 P.M. *General Meeting*—University High Library, Miss Elinor Flagg, I.S.N.U., Leader.

Speaker: Dr. M. L. Hartung, Associate Professor in the Teaching of Mathematics at the University of Chicago, "Arithmetic as a Developmental Task of Children."

Dr. Hartung will comment briefly upon questions presented by discussion groups.

3:00 P.M.—Dismissal.

SECONDARY SECTION

All Meetings in the Science Building

9:15 A.M. *General Meeting*—Room 102, Dr. Bjarne Ullsvik, I.S.N.U., Leader.

Speaker: Dr. M. L. Hartung, Associate Professor in the Teaching of Mathematics at the University of Chicago, "The Curriculum in Secondary Mathematics for General Education."

Panel Discussion: Mr. L. D. Murray, Principal, Community High School, Gridley, Illinois.

Mr. Harold Dorland, Principal, Township High School, Streator, Illinois.

Dr. Charles Allen, Principal, University High School, Urbana, Illinois.

11:15 A.M. *Discussion Groups*—Science Building.

SCIENCE AND MATHEMATICS—Room 101

Dr. R. U. Gooding, I.S.N.U., Leader

Speakers: Mr. Ralph Edwards, Mr. E. B. List, Mr. Leo Martin, Streator High School, "Methods for Teaching Concepts Common to Science and Mathematics."

GENERAL MATHEMATICS—Room 102

Dr. Bjarne Ullsvik, I.S.N.U., Leader

Speaker: Mr. L. B. Aseltine, Joliet Township High School and Junior College, "Problems Associated with General Mathematics as a Beginning High School Mathematics Course."

FIRST YEAR ALGEBRA—Room 110

Miss Elinor Flagg, I.S.N.U., Leader

Speaker: Miss Theresa Henneberry, Community High School, Lincoln, Illinois, "Making the Teaching of First Year Algebra Meaningful."

PLANE GEOMETRY—Room 107

Dr. Clyde T. McCormick, I.S.N.U., Leader

Speaker: Mr. Leslie L. Rabe, LaSalle-Peru High School and Junior College, "Placing Emphasis on the Purposes of Plane Geometry."

ADVANCED HIGH SCHOOL MATH.—Room 108

Mr. Dougas Bey, I.S.N.U., Leader

Speaker: Miss Agnes L. Nelson, Urbana High School, Urbana, Illinois, "Vitalizing the Teaching of Advanced High School Mathematics."

1:45 P.M. *General Meeting*—Room 102, Dr. C. N. Mills, I.S.N.U., Leader

Speaker: Miss Mary Potter, Supervisor of Mathematics in the Public Schools of Racine, Wisconsin, "A Place for General Mathematics in the High School Curriculum."

Miss Potter will comment briefly upon questions presented by the discussion groups.

3:00 P.M.—Dismissal.

TWENTY-FIFTH ANNUAL JOINT MEETING OF THE LOUISIANA-MISSISSIPPI SECTION OF THE MATHEMATICAL ASSOCIATION OF AMERICA AND THE LOUISIANA-MISSISSIPPI BRANCH OF THE NATIONAL COUNCIL OF TEACHERS OF MATHEMATICS

The meeting took place on the campus of Southwestern Louisiana Institute, Lafayette, Louisiana, on the 23rd and 24th of April, 1948. This was one of the best, and perhaps the largest meetings we have ever had. There were 106 registrants and several who were known to have not registered. Of this number 30 were members of the Council, 38 were members of the Association and 10 were members of both organizations. Several new members were added to the Council. The total number is not known since several of us received the membership blanks.

Our guest speaker was Professor C. V. Newsom of Oberlin College—who is editor of the

American Mathematical Monthy. He gave us three splendid speeches.

The program follows:

THE LOUISIANA-MISSISSIPPI SECTION OF THE MATHEMATICAL ASSOCIATION OF AMERICA

Room 202, Girard Hall—2:30 P.M. Friday, April 13

Vice-Chairman, Presiding.—Z. L. Loflin, Southwestern Louisiana Institute.

Secretary.—F. C. Gentry, Louisiana Polytechnic Institute.

Announcements and Appointment of Committees:

1. The Inversion of Certain Integrals, D. B. Sumner, Louisiana State University.
2. Subpedal Curves, V. B. Temple, Louisiana College.
3. Mathematical Topics for College Freshmen, Sam W. Shelton, Northwestern State College.
4. Dimensions and Compacting, A. D. Wallace, Tulane University.
5. The Solution of Killing's Matric Equation, Malcolm E. Gillis, Blue Mountain College.
6. A Condition for the Oscillation of the Solutions of a System of Homogeneous Linear Differential Equations, C. P. Gadsden, Tulane University.
7. Recent Problems in the Training and Preparation of Mathematics Teachers, T. A. Bickerstaff, University of Mississippi.
8. Twenty-five Years with the La. Miss. Section of the M. A. of A., H. F. Schroeder, Louisiana Polytechnic Institute.

JOINT BANQUET—(Informal)

Oak Grove Inn—7:30 P.M.

Toastmaster.—Professor Z. T. Gallion.

Welcome: Dean H. L. Griffin, Dean of College of Liberal Arts, Southwestern Louisiana Institute.

Response: Miss Mary Morphis, Hattiesburg Jr. High School—For The National Council; Dean J. A. Hardin, Centenary College—For The Association.

Address: Relationship of the Association and the National Council, C. V. Newsom, Oberlin College, Oberlin, Ohio.

LOUISIANA-MISSISSIPPI BRANCH OF THE NATIONAL COUNCIL OF TEACHERS OF MATHEMATICS

Room L-2, New Science—8:30 A.M., Saturday, April 24, 1948

Chairman, Presiding.—Miss Lurnice Begnaud, Lafayette, Louisiana.

Secretary.—Miss Mary Morphis, Hattiesburg, Mississippi.

1. Report of the Indianapolis Meeting, Houston T. Karnes, Louisiana State University.
2. Building of a Vocabulary for the Solving of Problems in Algebra, Miss Anna F. Koch, Sophie B. Wright High School.
3. Algebra in Grade Nine, Miss Elora Keyes, Hattiesburg Junior High School.
4. Some Problems of the Teacher of Secondary Mathematics, C. V. Newsom, Oberlin College.
5. Charts as a Teaching Aid in High School Mathematics, Mrs. Ida Mae Heard, Southwestern Louisiana Institute.
6. The Plus Value, Miss Lula Webb, Pearl River Junior College.
7. Report of the Joint Committee, W. L. Duren, Tulane University.
8. Election of Officers.

THE LOUISIANA-MISSISSIPPI SECTION OF THE MATHEMATICAL ASSOCIATION OF AMERICA

Room L-2, New Science—10:30 A.M., Saturday, April 24

Vice-Chairman, Presiding.—T. A. Bickerstaff, University of Mississippi.

Secretary.—F. C. Gentry, Louisiana Polytechnic Institute.

Address: Mathematics and our Culture, C. V. Newsom, Editor, *American Mathematical Monthly.*

Business Meeting and Election of Officers

OFFICERS 1947–48
LOUISIANA-MISSISSIPPI BRANCH OF THE NATIONAL COUNCIL OF TEACHERS OF MATHEMATICS

Chairman.—Miss Lurnice Begnaud, High School, Lafayette, Louisiana.

Vice-Chairman.—G. E. Miller, Northwestern State College, Natchitoches Louisiana.

Secretary.—Miss Mary Morphis, Junior High School, Hattiesburg, Mississippi.

Recorder.—Houston T. Karnes, Louisiana State University, Baton Rouge, Louisiana.

Louisiana Representative.—Miss Jessie May Hoag, Southwestern Louisiana Institute, Lafayette, Louisiana.

Mississippi Representative.—Miss Lurline Stewart, Hinds Junior College, Raymond, Mississippi.

OFFICERS 1947–48
LOUISIANA-MISSISSIPPI SECTION OF THE MATHEMATICAL ASSOCIATION OF AMERICA

Chairman.—W. L. Johnson (Deceased), Mississippi Southern College.

Vice-Chairman.—T. A. Bickerstaff, University of Mississippi.

Vice-Chairman.—Z. L. Loflin, Southwestern Louisiana Institute

Secretary.—F. C. Gentry, Louisiana Polytechnic Institute.

The following officers of the Council were elected for the year 1948–49: Miss Elora Keyes, Chairman, Hattiesburg Junior High School, Hattiesburg, Miss. Miss Lula Webb, Vice-Chairman, Pearl River Junior College. Mrs. Ida Mae Heard, Secretary, Southwestern Louisiana Inst., Lafayette, La. Houston T. Karnes, Recorder, Louisiana State University, Baton Rouge, La. State Representatives are: Miss Jessie May Hoag, Louisiana Southwestern Louisiana Ins., Lafayette, La. Miss Lurline Stewart, Mississippi Hinds Junior College, Raymond, Miss.

The North Louisiana Mathematics Teachers Association held its meeting at Louisiana Polytechnic Institute in Ruston, Louisiana, on Friday, April 30, 1948. Officers 1947–48: Lester M. Garrison, Louisiana Polytechnic Institute—President; Mark A. Price, Principal Winnsboro High School—Vice-President; Mrs. H. E. Richardson, Jonesboro-Hodge High School—Secretary.

LITTLE THEATER, HOWARD HALL—9:30 A.M.
Lester M. Garrison, President, Presiding

1. Welcome: President Claybrook Cottingham, Louisiana Polytechnic Institute.
2. What Constitutes a Good High School Mathematics Program: S. G. Lucky, Principal, Bastrop High School.
3. Better Coordination of High School and College Mathematics: Miss. R. Johnson, Ruston High School.
4. Greetings from The National Council of Teachers of Mathematics: Dr. F. C. Gentry, Louisiana Polytechnic Institute.

LUNCH HOUR, LITTLE DINING HALL—11:15 A.M.
Henry F. Schroeder—Toastmaster
Music

LITTLE THEATER, HOWARD HALL—1:15 P.M.
Mark A. Price, Vice-President, Presiding

5. The Freshmen Testing Program at Louisiana Polytechnic Institute: H. Hearn, Louisiana Polytechnic Institute.
6. Question Box and General Discussions: Dr. P. K. Smith, Louisiana Polytechnic Institute.
7. Business Session.

A joint luncheon and panels of association of chairmen of department of mathematics and the association of teachers of mathematics of New York City were held on March 13, 1948. Panels at the Horace Mann School, 551 West 120th Street, 10:00 A.M. Luncheon at the Men's Faculty Club, 400 West 117th Street, 12:30 P.M.

The Committee: Mr. J. G. Deutsch, Mr. Samuel L. Greitzer, Mrs. Lorraine Addelston, Mrs. Ruth Ruderman, Mr. Daniel Malament.

Main Address: Professor Arnold Dresden of Swarthmore University, "Learning and Teaching."—Ways in which the development of the teacher of mathematics can be brought into harmony with his professional obligation.

PANEL DISCUSSIONS

Panel I—Arithmetic for Seventh through Ninth Years
Room 417—Horace Mann Bldg.

Chairman, Mrs. Lorraine W. Addelston, Junior High School, 159, Manhattan.

a. Remedial Arithmetic in Action.—A demonstration lesson.
Class: An eighth year class from the Herman Ridder Junior High School.
Teacher: Miss Lenore Rosini.
Discussion leader: Mrs. Grace C. Wile, Assistant Principal, Public School 83, Brooklyn.

b. Film.—"What are Fractions?" Presented by Films, Inc., represented by Mr. Hamlin and Mr. Devereux, who will lead discussion and answer questions.

Panel II—The Extracurricular Program in Mathematics
Room 201—Horace Mann Bldg.

Chairman: Mr. Daniel Malament, Brooklyn Technical High School.

a. General Aims and Objectives of an Extracurricular Program in Mathematics.
Mr. Benjamin Braverman, Seward Park High School.

b. The Mathematics Assembly and the Mathematics Magazine.
Mr. Simon Berman, Stuyvesant High School.

c. The Mathematics Team.
Mrs. Shirley Weissman, Bronx High School of Science.

Panel III—Guidance for the Mathematics Student
Room 418—Horace Mann Bldg.

Chairman, Mr. Irving Adler, Straubenmuller Textile High School.

Speakers:

a. Mr. R. C. Fremon, in charge of employment and training in non-engineering categories, Bell Telephone Laboratories.

b. Assistant Superintendent David H. Moskowitz, High School Division, Board of Education.

c. Assistant Superintendent Morris Krugman, Division of Educational and Vocational Guidance, Board of Education.

On the Dais: Miss Margaret C. Byrne, Principal, Wadleigh H. S. (retired); Professor Arnold Dresden, Swarthmore College; Professor Howard F. Fehr, State Teachers College, Montclair, N. J.; Mr. R. C. Fremon, Bell Telephone Laboratories; Professor Ronald M. Foster, Polytechnic Institute of Brooklyn; Mr. Morris Hertzig, Principal, Arthur S. Somers Junior High School; Miss Antonia Higginson, President, Mathematics Chairmen's Ass'n.; Professor Edward Kasner, Columbia University; Miss Mary A. Kennedy, Assistant Superintendent, Board of Education, N. Y. C.; Dr. Morris Krugman, Assistant Superintendent Board of Education, N. Y. C.; Mr. Joseph Jablonower, Member, Board of Examiners; Miss Theresa Molloy, Chairman, Standing Committee on Mathematics; Mr. David H. Moskowitz, Assistant Superintendent; Board of Education, N. Y. C.; Professor William D. Reeve, Teachers College, Columbia University; Mr. George J. Ross, President, Ass'n. of Teachers of Mathematics; Mr. Fred Schoenberg, Principal, Stuyvesant H. S.; Mr. Morris Hertzig, *Toastmaster.*

The spring conference of Minnesota Mathematics Teachers was held at the University of Minnesota, Coffman Memorial Union, April 23 and 24, 1948. Sponsored by College of Education, University of Minnesota and the Minneapolis Mathematics Club.

PROGRAM

Friday, April 23, 1948

1:30 P.M. Exhibit of Mathematics Teaching Aids Room 325

1:30 P.M. New Filmstrips on Mathematics Room 320

2:00 P.M. New Motion Pictures on Mathematics

2:30–3:30 P.M. Coffee Hour Room 325
Host: Minneapolis Mathematics Club

3:30–4:30 P.M. The Use of Recreational Mathematics in the Classroom.

Room: Women's lounge
Chairman: Miss Harriet Madigan, President Minneapolis Mathematics Club.
Speaker: Mr. Charles Hatfield Jr., Univ. of Minn.
Discussion and Announcements

Saturday, April 24, 1948

9:00–10:30 A.M.—Exhibit of Teaching Aids
9:00–10:30 A.M.—Films and Filmstrips on Mathematics
10:30–12:00 A.M.—"The Applications of Mathematics" Rm. 320. Chairman: Mr. Jim R. Shunert, Univ. of Minn. Speakers on applications of mathematics in industry, science, business and the community to be announced.
Discussion
12:30 P.M.—Luncheon
Toastmaster: Mr. Wm. H. Bussey
Speaker: Mr. Harry Johnson, State Teachers College, Buffalo, New York
Topic: "Making Mathematics Meaningful in the Junior and Senior High School."

Spring Meeting of the Association of Teachers of Mathematics in New England

A large and interested group of mathematics teachers gathered at Phillips Exeter Academy, Exeter, N. H., on May 1, 1948 for the forty-sixth spring meeting of The Association of Teachers of Mathematics in New England. The topic for discussion during the morning session was, "What Mathematics shall we teach college preparatory pupils in Grade Twelve?"

Professor Albert W. Tucker, Director of Mathematics for Freshmen and Sophomores at Princeton University opened the discussion on this subject by presenting the point-of-view of the teacher in a liberal arts college. Professor Tucker placed the development of mathematical skill, thinking, and appreciation before the group as valuable aims of the twelfth grade college preparatory pupils. His discussion of the future uses of and the background required for the mathematics at this level laid the groundwork for an interesting discussion.

Professor Ralph N. Cobb of Worcester Polytechnic Institute discussed this subject from the point-of-view of a teacher in an engineering college. He urged that Solid Geometry be given a definite place in the syllabus universally because, among other things, it develops three-dimensional visualization. He further urged that the objective be to, "Get pupils to say what they mean and to understand it."

A delightful luncheon was punctuated by the unravelling of the mystery story of "Miss Poly Gon" a game which all enjoyed. In the afternoon Mr. William W. Turnbull, Secretary to the College Entrance Examination Board, presented an extremely interesting and thorough discussion of "College Entrance Tests in Mathematics." His presentation of the purposes, preparation and programs of the tests incited many questions from the interested group.—Ralph F. Ward, Director of Mathematics, Brookline, Mass.

A New Institute for Teachers of Mathematics

The first annual Institute for Teachers of Mathematics sponsored by The Association of Teachers of Mathematics in New England will be held in August, 1949, on the Wellesley College campus in Wellesley, Massachusetts. Mathematics Teachers everywhere will welcome the opportunity to spend a week in late August in New England, "The Playground of America." Watch for further details.

The opening meeting of the Women's Mathematics Club of Chicago and vicinity was held on Saturday, October 2, 1948 at 11:45 A.M. in Mandel's Tea Room. The speaker was Miss Martha Hildebrandt.

Miss Hildebrandt taught at the University of Illinois this summer and spoke on several phases of her work: "The Teaching of Essential Mathematics."

The Spring Meeting of the Mathematics Section of the Colorado Education Association was held in Denver, Colo., on May 1, 1948.

Panel

Articulation Among the Levels of Training in Mathematics

Moderator—Maurice Ahrens
Elementary School Representative—Elizabeth Lort
Junior High School Representative—George Cutting
High School Representative—Ruth Hoffman
College Representative—Ivan Hebel

The Panel was followed by a question and discussion period.

Members of the Executive Council

President—Prof. A. W. Recht, 233 S. St. Paul St., Denver
Vice-President—Prof. Aubrey Kempner University of Colorado, Boulder
Secretary-Treasurer—Burnett Severson, 2755 Steele St., Denver

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The eighth meeting of the Men's Mathematics Club of Chicago and the metropolitan area for the season of 1947–1948 was held on Friday, May 21, 1948 at the Central YMCA.

Professor B. R. Ullvrik of Illinois State Normal University at Normal, Ill., was the speaker. His topic was "General Education—Nemesis or Fortune for Mathematics."

Don't forget to send your requests for room reservations for the Ninth Christmas Meeting of the National Council of Teachers of Mathematics to be held on Wednesday and Thursday, December 29 and 30, 1948, to Mr. Oscar Schaaf, Room 120, Arps Hall, Ohio State University, Columbus, Ohio.

The Eighty-ninth Regular Meeting of the Association of Mathematics Teachers of New Jersey, was held at the American Room, Hotel Traymore, Atlantic City, on November 13, 1948.

Program

10:30 A.M. "Put Your Mathematics to Work." Joseph Hilsenrath, Naval Ordinance Laboratory, Washington, District of Columbia

11:00 A.M. "Mathematical Thought and Democratic Zeal, Howard F. Fehr, Teachers College, Columbia University, New York City

11:30 A.M. Panel Discussion

The Use of Manipulative Materials in Teaching Fractions in Arithmetic

Foster L. Grossnickle, Jersey City Teachers College, Jersey City, New Jersey

Elizabeth Cullen, Hamilton Junior High School, Elizabeth, New Jersey

Mary Ferguson, Primary Supervisor, Atlantic City, New Jersey

Helen P. Sutton, J. W. Wakeman School, Jersey City, New Jersey

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12:15 P.M. Discussion

The thirtieth summer meeting of the Mathematical Association of America was held at the University of Wisconsin, Madison, Wisconsin, on Monday and Tuesday, September 6–7, 1948 in conjunction with the summer meeting and colloquium of the American Mathematical Society and meetings of the Institute of Mathematical Statistics, the Econometric Society, and Section A of the American Association for the Advancement of Science.

PROGRAM

First Session

Mathematical problems associated with the use of laminates in aircraft.—Professor H. W. March, University of Wisconsin and U. S. Forest Products Laboratory.

Definition of angles in higher dimensional spaces.—Professor S. S. Cairns, University of Illinois.

An experiment in teaching large classes in mathematics.—Professor H. F. S. Jonah, Purdue University.

Second Session, Tuesday

Exterior ballistics of artillery rockets.—Professor J. B. Rosser, Cornell University.

What is homotopy?—Professor Samuel Eilenberg, Columbia University.

Enrichment of the mathematical curriculum for juniors and seniors.—Professor M. H. Stone, University of Chicago.

ANNOUNCEMENT OF AMERICAN COUNCIL ON EDUCATION'S 1949 TEACHER EXAMINATION PROGRAM

Arrangements may now be made for the establishment of examining centers for the tenth annual administration of the American Council on Education's National Teacher Examinations.

The Teacher Examinations are administered through the facilities of the Educational Testing Service, and examining centers are conducted in cooperation with school systems and teacher education institutions.

Many superintendents and boards of education require or advise applicants for teaching positions to present National Teacher Examination records. The examination results are used as *one* of the factors in teacher selection.

The Teacher Examinations also are administered in connection with teacher education programs in colleges and universities, both at undergraduate and graduate levels.

Used in combination with additional information such as that provided by records of experience, academic marks, ratings of various aspects of personality, etc., the Teacher Examination results can contribute materially to the raising of standards of teaching.

The American Council on Education welcomes the use of its Teacher Examinations by any school system or college, *provided* assurance is given that the examination results will be *used wisely in combination* with other significant information concerning the prospective teacher.

Arrangements for the establishment of examining centers should be made by superintendents of schools and college officials before November 15, 1948. Correspondence regarding cooperation in the project may be addressed to: Director, National Teacher Examination Project, Educational Testing Service, 15 Amsterdam Avenue, New York 23, New York.

Guidance Pamphlet in Mathematics

We have just now reprinted 10,000 more copies of the "Guidance Pamphlet in Mathematics" the first edition of 25,000 being practically exhausted. This pamphlet should be in the hands of every ninth grade pupil in all high schools all over the country. The leading article in the December issue of the *Teacher* will give a very fine appraisal of the pamphlet that should convince teachers of its value. Order your copies now. Price 25¢ each postpaid; for orders of 10 or more the price is 10¢ each postpaid. Send orders to THE MATHEMATICS TEACHER, 525 W. 120th St., New York 27, N. Y.

OFFICIAL NOTICE

By EDWIN W. SCHREIBER, *Secretary*

As Secretary of the National Council of Teachers of Mathematics, I officially announce the annual election of certain officers of the National Council. Said election to take place in February 1949.

At the Atlantic City meeting, February 28, 1948, the nominating committee, consisting of the two most recent ex-presidents and the secretary as chairman (for year 1948, F. Lynwood Wren, Carl N. Shuster, and Edwin W. Schreiber), was instructed to prepare an official ballot naming two eligible candidates for each elective office, reserving a blank space for a third prospective candidate, whose name may be written in by the voter. The officers to be elected are: second vice-pres., 1949–1950 and three directors 1949–1951. The post-card ballot will be sent through the mail about February 15.

The periods of service of the officers of the National Council from its organization in February 1920 to the present time are printed below.

The National Council of Teachers of Mathematics

Organized 1920—Incorporated 1928

* H. E. Slaught, Chicago, Ill., 1936–1937, *Honorary President*

Presidents

1. C. M. Austin, Oak Park, Ill., 1920
2. J. H. Minnich, Philadelphia, Pa., 1921–1923
3. Raleigh Schorling, Ann Arbor, Mich., 1924–1925
4. Marie Gugle, Columbus, Ohio, 1926–1927
5. Harry C. Barber, Exeter, N. H., 1928–1929
6. J. P. Everett, Kalamazoo, Mich., 1930–1931
7. William Betz, Rochester, N. Y., 1932–1933
8. J. O. Hassler, Norman, Okla., 1934–1935
9. Martha Hildebrandt, Maywood, Ill., 1936–1937
10. H. C. Christofferson, Oxford, Ohio, 1938–1939
11. Mary A. Potter, Racine, Wis., 1940–1941
12. Rolland R. Smith, Springfield, Mass., 1942–1943
13. F. Lynwood Wren, Nashville, Tenn., 1944–1945
14. Carl N. Shuster, Trenton, N. J., 1946–1947
15. E. H. C. Hildebrandt, Evanston, Illinois, 1948–1949

Vice-Presidents

1. H. O. Rugg, New York City, 1920
2. E. H. Taylor, Charleston, Ill., 1921
3. Eula Weeks, St. Louis, Mo., 1922
4. Mable Sykes, Chicago, Ill., 1923
5. Florence Bixby, Milwaukee, Wis., 1924
6. Winnie Daley, New Orleans, La., 1925
7. W. W. Hart, Madison, Wis., 1926
8. C. M. Austin, Oak Park, Ill., 1927–1928
9. Mary S. Sabin, Denver, Colo., 1928–1929
10. Hallie S. Poole, Buffalo, N. Y., 1929–1930
11. W. S. Schlauch, New York City, 1930–1931
12. Martha Hildebrandt, Maywood, Ill., 1931–1932
13. Mary A. Potter, Racine, Wis., 1932–1933
14. R. Beatley, Cambridge, Mass., 1933–1934
15. *A. R. Congdon, Lincoln, Neb., 1934–1935
16. Florence Brooks Miller, Shaker Heights, Ohio, 1935–1936
17. *Mary Kelly, Wichita, Kans., 1936–1937
18. John T. Johnson, Chicago, Ill., 1937–1938
19. Ruth Lane, Iowa City, Iowa, 1938–1939
20. E. R. Breslich, Chicago, 1939–1940
21. F. L. Wren, Nashville, Tenn., 1940–1941
22. R. L. Morton, Athens, Ohio, 1941–1942
23. Dorothy S. Wheeler, Hartford, Conn., 1942–1943
24. Edwin G. Olds, Pittsburgh, Pa., 1943–1944
25. Edith Woolsey, Minneapolis, Minn., 1944–1945
26. L. H. Whitcraft, Muncie, Ind., 1945–1946
27. H. W. Charlesworth, Denver, Colo., 1946–1947
28. E. H. C. Hildebrandt, Evanston, Ill., 1947–1948
29. Vera Sanford, Oneonta, N. Y., 1948–1949

Secretary-Treasurers

J. A. Foberg, Chicago, Ill., 1920–1922, 1923–1926, 1927, 1928

Edwin W. Schreiber, Ann Arbor, Mich., and Macomb, Ill., 1929–

Committee on Official Journal

John R. Clark, Editor, 1921–1928
W. D. Reeve, Editor, 1928–
Vera Sanford, 1929–

*H. E. Slaught, 1928–1935
W. S. Schlauch, 1936–

Directors

Marie Gugle, Columbus, Ohio, 1920–1922, 1928–1930, 1931–1933
Jonathan Rorer, Philadelphia, Pa., 1920–1922
Harry Wheeler, Worcester, Mass., 1920–1921
W. A. Austin, Fresno, Cal., 1920–1921
W. D. Reeve, Minn., Minn., 1920, 1926–1927
W. D. Beck, Iowa City, Iowa, 1920
*Orpha Worden, Detroit, Mich., 1921–1932, 1924–1927
C. M. Austin, Oak Park, Ill., 1921–1923, 1924–1927, 1930–1932, 1940–1942
Gertrude Allen, Oakland, Calif., 1922–1924
W. W. Rankin, Durham, N. C., 1922–1924
Eula Weeks, St. Louis, Mo., 1923–1925
W. C. Eells, Walla Walla, Wash., 1923–1925
*Harry English, Washington, D. C., 1925–1927, 1928–1930
Harry C. Barber, Boston, Mass., 1925–1927, 1930–1932, 1933, 1935
*Frank C. Touton, Los Angeles, Calif., 1926–1928
Vera Sanford, New York City, 1927–1928
William Betz, Rochester, N. Y., 1927–1929, 1930–1931, 1934–1936, 1937–1939
Walter F. Downey, Boston, Mass., 1928–1929
Edwin W. Schreiber, Ann Arbor, Mich., 1928–1929
Elizabeth Dice, Dallas, Tex., 1928, 1929–1931
J. O. Hassler, Norman, Okla., 1928, 1929–1931, 1933, 1941–1943
John R. Clark, New York City, 1929–1931
Mary S. Sabin, Denver, Colo., 1929–1933
J. A. Foberg, California, Pa., 1929
C. Louis Thiele, Detroit, Mich., 1931–1933
*Mary Kelly, Wichita, Kans., 1932
John P. Everett, Kalamazoo, Mich., 1932–1934
Elsie P. Johnson, Oak Park, Ill., 1932–1934
Raleigh Schorling, Ann Arbor, Mich., 1932–1934
W. S. Schlauch, New York City, 1933–1935
H. C. Christofferson, Oxford, Ohio, 1934–1937
Edith Woolsey, Minn., Minn., 1934–1936, 1937–1939
Martha Hildebrandt, Maywood, Ill., 1934–1935, 1938–1939
M. L. Hartung, Madison, Wis., 1935–1937, 1938–1940
Mary A. Potter, Racine, Wis., 1935–1937
Rolland R. Smith, Springfield, Mass., 1935–1937, 1938–1940
E. R. Breslich, Chicago, Ill., 1936–1938
L. D. Haertter, Clayton, Mo., 1936–1938
Virgil S. Mallory, Montclair, N. J., 1936–1941
Kate Bell, Spokane, Wash., 1938–1943
A. Brown Miller, Cleveland, Ohio, 1939–1943
Dorothy Wheeler, Hartford, Conn., 1939–1941
Hildegarde Beck, Detroit, Mich., 1940–1942, 1943–1945
H. C. Charlesworth, Denver, Colo., 1940–1942, 1943–1945
L. H. Whitcraft, Muncie, Ind., 1941–1943
*A. R. Congdon, Lincoln, Nebr., 1941–1943
Ina E. Holroyd, Manhattan, Kans., 1941–1943
Veryl Schult, Washington, D. C., 1943–1945, 1946–1948
E. H. C. Hildebrandt, Evanston, Ill., 1944–1946
C. N. Shuster, Trenton, N. J., 1944–1945
Ruth W. Stokes, Rock Hill, S. C., 1944–1946
Lorena E. Cassidy, Wichita, Kans., 1945–1947
Harold B. Garland, Boston, Mass., 1945–1947
George E. Hawkins, LaGrange, Ill., 1945–1950
Lee E. Boyer, Millarsville, Pa., 1946–1948
W. H. Carnahan, Boston, Mass., 1946–1948
Ona Kraft, Cleveland, Ohio, 1946, 1947–1949
Chas. H. Butler, Kalamazoo, Mich., 1947–1949
*Emma Hesse, Berkeley, Calif., 1947
Elenore M. Lazansky, Lafayette, Calif., 1948
Marie S. Wilcox, Indianapolis, Ind., 1948–51
James H. Zant, Stillwater, Okla., 1948–51

* Deceased.

ATTENDANCE RECORD OF THE TWENTY-SIXTH ANNUAL MEETING INDIANAPOLIS, INDIANA, APRIL 1-3, 1948

Compiled by EDWIN W. SCHREIBER, *Secretary, State College, Macomb, Illinois*

ARKANSAS
Arkadelphia
Hyman, Hugh
CALIFORNIA
Los Angeles
*Carpenter, Dale
Stockton
*Keniston, Rachel P.
*Tully, Jean
COLORADO
Boulder,
Kempner, Aubrey
Denver
*Charlesworth, H. W.
Charlesworth, Mrs.
*Doremus, Mary C.
*Duer, Lillian E.
Mills, Muriel
*Recht, Albert W.
DISTRICT OF COLUMBIA
Washington
*Barnes, Beatrice
*Berkey, Josephine
*Derrick, Gunievere B.
*Grubbs, Ethel H.
*Holland, Gwendolyn D.
*Schult, Veryl
*Tolson, Juanita
GEORGIA
Atlanta
*Green, Sue
*Patton, Bess
ILLINOIS
Belleville
*Hexter, Edw. G.
*Karch, John A.
Bradford
*Vanzant, Sallie
Carthage
Berger, Ortha
*Franks, Milford
Grant, Kenneth W.
McKnight, Willis
Rossmiller, Wallace H.
Casey
*Jonson, Maurine
Champaign
Havel, James J.
Martin, James E.
Medendorp, Alan R.
Merwin, Jack C.
Olsen, Floyd A.
Phillips, Clarence
Smith, Louis M.
Sokslwski, Opkia
Charleston
*Heller, Hobart F.
*Hendrix, Gertrude
Chicago
Bachlund, Linnea
*Balzhiser, Marie
*Buswell, Guy T.
*Bradfield, George F.
*Breslich, E. R.
*Cobb, J. Agnes
*Fogelson, Ida D.
*Hartung, Maurice L.
Horn, Clara E.
*Jautz, Lucile B.

*John, Lenore
*Lindber, Viola
Ludwig, Ruth
Merriman, Justin H.
*Merton, Elda L.
Moody, E. G.
Moody, E. G. (Mrs.)
Moran, Charles W.
*Nyberg, Jos. A.
*Russell, George E.
*Sims, Wilma T.
*Skinner, Kate E.
*Urbancek, Joseph J.
*Welch, Richard
*Wood, Harry H.
*Young, Philip P.

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*Busby, Lois
*Cowan, Esther
*Payne, Gertrude
Signe, Larson
Wilkins, Glenna

Clinton
*Foote, Frances
*Marshall, Opal

Decatur
*Blackford, Clarence
*Brown, Francis R.
Clapp, Carl
*Fischer, Georgia H.
Jones, Lettie
Maurer, J. J.
Pestley, Margery
Shepard, Ruth Ann
*Svendsen, Eline
*Taylor, Clarence F.
Westerman, Ralph B.

Dupo
*Glascock, Lucy

Elgin
*Peters, Mary

Evanston
*Johnson, John T.
*Hildebrandt, E. H. C.

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Hysler, M. Doris

Galesburg
*Snader, Daniel W.

Highland Park
*Winkley, C. J.

Jacksonville
Evans, Elsie

Kankakee
*Hopkins, Mildred
*Ingli, Guendolen

Kewanee
*McCarthy, Harriet

LaGrange
*Hawkins, George E.

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*Roth, Selma

Libertyville
*Hart, Walter W.

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*Schreiber, Edwin W.
Schreiber, E. W. (Mrs.)
*Stipanowich, Joseph
*Tayler, Loren

Maywood
*Baer, Floyd W.
*Foster, U. C.
*Hildebrandt, Martha
*Joyner, Earl

Monmouth
*McKeown, Marjorie

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*McLaughlin, Clara B.

Mt. Zion
*Crum, Catherine

Normal
*Flagg, Elinor B.
*McCormick, Clyde T.
*Ullsvik, Bjarne R.

Ottawa
*LeMay, Mary R.

Park Ridge
Herrell, Oakley T.
Herrell, (Mrs.)

Pekin
*Blair, F. Mae
Cyrier, Frances M.
*Large, Emma Mae
*McCoy, M. Eleanor
Tetley, A. C.

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Barrick, Beulah
*Campbell, Lorene
*Clapper, Sadie E.
*Mason, Irene B.
*Pfeifer, Helen
*Sadler, Louise

Urbana
Bauer, Marie
Brahana, H. R.
Brahana, Myrtle
Fulton, Pauline
Mara, Warren F.
*Martley, Miles
Mehl, Bernard
*Meserve, Bruce E.
*Nelson, Agnes L.
*Nuess, Vivian
Payne, Joseph C.
Smith, Harry E.
Taich, Melvin

INDIANA

Alexandria
*Slone, Katie C.

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*Bowen, Therese
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*Folger, Edna V.
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Hovermale, Glen

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*French, Doyle J.
Harvey, Rex
Heeter, George V.
*Kerr, Lester
Roose, Rosemary
*Stafford, Charlotte

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Griffin, Mattie

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*Saltzman, Mildred

Williams, Mary
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*Sanders, Della M.
Frankton
*Conkling, Kennethe
Fontanet
Brenton, Charles
Frankfort
Knox, Doris
Franklin
Freeman, Gladys
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*Stephan, Dorothy
Vandivia, Hugh E.
Ft. Wayne
Blesch, Grace
Bird, R. B.
*Chausse, Ruth
Cramer, D. T.
*Danuser, Virginia
Dornte, Robert
*Fiedler, Adelaide
Beck, Elsie E.
Kurtz, Gaylord S.
Miller, Marie
*Morris, John M.
Pennanyton, Everett L.
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*Pusey, Catherine
Rahdert, Martha
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Rowe, Russell R.
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*Sites, Venette
*Turpin, Charles P.
*Virts, Ralph
*Wear, Olive
Yates, Thomas
Young, Delmas L.
Gary
Albright, Frank S.
Boose, Mrs. Doris
*Flewelling, Wilma
*Gwinn, Adele
*Leskov, Olive
*Rzepka, Helen
*Stewart, Leonara
Waggoner, Olive E.
Wallan, Frank
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*Meyer, Lawrence
Graysville
*Close, Norma
Goodland
*Hart, Wm. L.
Goshen
*Schenck, Stanley
Greencastle
Edington, Will E.
Hardman, Harold
Greenfield
*LeVier, Fernande
Greenwood
*Croas, Jennie A.
Hagerstown
Bowman, Elmer
*Lester, Florence B.
Nichols, Robert W.
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Abell, Thelma
*Bollin, Alice M.
*Garrett, Chas. G.
*Groves, Marjorie
*Neal, Sadie Mae
Steiner, Gertrude V.
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*Allee, Kenneth O.
Grimme, Ralph
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Jenkins, Ruth
Huntington
*Shipley, Edna
Martin, Pearl L.
Weiford, Florence
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*Hamblen, John
Jamestown
*Hicks, Hazel
Knightstown
*Jones, Hazel C.
Trotter, Mabel
Kokomo
Downey, Mae
Franklin, Chas. W.
Keisling, Lloyd
Kiger, Earl
Robey, Martha S.
*Sexton, Neva
Smith, Ralph
Lafayette
Kenzler, Geo. S.
O'Leary, Vincent
Rothrack, Elizabeth
Seever, Mary F.
Vogel, Beatrix
*Wirsching, Florence
LaPorte
*Hogle, Charlotte
*Knight, Azalia
Lebanon
*Beckett, K. Eileen
Brookshire, Ruth
Logansport
*Martin, Eunice
Shanks, Oris R.
Spinning, Jean
Lowell
Baughman, Mary F.
Marion
Albertson, James
Farley, Margaret
Johnson, Mary E.
Modlin, Frances
*Robinson, Lorene
Weaver, Oran Lee
*Wimpy, Sarah
Martinsville
*Gray, Opal
*Jarrett, Evelyn C.
*Rose, Margaret
Mishawaka
*Broman, Ray A.
*Neegent, Esther
Schreiber, R. E.
Yoder, Mary Jean
Michigan City
Giffel, William T.
*Lockridge, Elbert
Middletown
*Sumner, Helen
Mitchell
Milburn, Herman
Mooresville
Van Liew, Elizabeth
Muncie
*Allan, Jeannette
Brumfiel, Charles
*Carr, Alice Rose
*Edwards, P. D.
*Fenimore, H. E.
*McCreery, Gene S.
*Manfield, Veda
*Michael, R. E.
Morrison, Nellie
*Shively, Leri S.
Shively, Mrs. L. S.
Whiteraft, L. H.
*Myers, Errol G.
New Albany
*Wells, Ruby
New Augusta
Brown, Ida H.
New Castle
Fadely, Amanda
Greenstreet, Jos.
Hartman, Mary Jean
Hayes, Mabel
*Hodson, Fern
Hodson, Ivan
Hodson, Mabel
Logan, Cleyta
Lough, Marylee
McClellan, Edan
*Orr, Eunice Cleo
Saint, Fern K.
Smith, Roxie
Van Bebber, Ruth
North Vernon
Brown, Lloyd
*Hall, O. O.
Nineveh
*Hibbs, Mrs. H. D.
Oaktown
Blanford, George A.
Oolitic
*Duncan, Dorothy
Peru
*Ridenour, Elizabeth
Plainfield
*Masten, Madge
Plymouth
Trowbridge, Julia
Richmond
Gladden, Lester
Gladden, Ruth
Arbogast, Grace
Richeson, Mrs. R. D.
*River, Lowell T.
Seider, Dale F.
*Sperling, Julia
Rossville
*Crum, Cecil Mrs.
Rushville
Darst, Louis C.
*DeMunbrun, Robert
Seymour
*Dittmer, J. Avery
Jubin, Jesse E.
*Truex, Ernest E.
Shelbyville
*Stuart, Ralph H.
*Wiley, Edith
Sheridan
*Miller, J. J.
South Bend
*Hayes, John V.
*Kitson, Mary
Southport
*Guyer, Eleanor
Speedway
Thompson, Muriel
St. Mary of the Wood
*Mulcahy, Helen B.
St. Meinrad
*Knaebel, Bonaventure

Terre Haute
*Blaikie, Muyrel
*Combs, Mrs. O. A.
Jaenisch, Mary L.
Jameison, Dale
*Kallas, Theodore
*Kelley, Inez
*Kennedy, Kathryn
*Laughlin, Hazel
*Lunsford, Rosella
*Moore, V. D.
*Morris, Inez
McPherson, R. E.
Records, Mary
Reitzel, Helen
*Shriner, Walter O.
Smith, Flore H.
Strong, Orvel
Van Ulzen, Alkan (Mrs.)
Wall, Lucy
Trafalgar
McNeely, Maurice
Valparaiso
*McGillicuddy, Clare
Varner, Marthalee
Vincinnes
Dunn, O. L.
Wabash
*Carothers, Bertha
*Young, Lutie
Wanamaker
*Hodgin, Lois Ann
Washington
Brown, Bessie
*Carnahan, Sidney
Doades, Clifford L.
Evans, Louis
*Gilliatt, Ruth
Harrod, Dully
Hunter, Harry
McCafferty, Grace
Prater, Dewey N.
Waynetown
Biddle, Elmer J.
West Lafayette
*Cooper, Hazel
*Fites, Bernice
Gold, Donald
Jonah, H. F. S.
*Keller, M. Wiles
Rothbart, Esther
West Terre Haute
*Bennett, Catherine
Jordan, Carl
Whiting
*Booth, Lean
*Canine, Margaret E.
Zionsville
*Colwell, Mrs. B. A.

Indianapolis
Brock, Marilyn
*Cook, Irma W.
Cunningham, Thomas
*Dye, Mrs. H. V.
*Forrest, Edith R.
*Hasseld, Bertha
Hayes, G. L.
Herbst, Frieda
Hutchinson, Mrs. J. J.
Jackson, Ethel M.
Lockridge, S.
Maurer, Wm. F.
*McDougall, Effie
Murdock, Leone
Ramey, Belle
Ronk, Mary E.
Sehneider, Dorothy
Starost, Helen
*Starost, Lillian
*Silver, Edith
Stultz, Fred
Williams, Edyth
Wood, Mrs. M. I.
5435 E. Washington St.
Nonte, Bernadine
801 S. State St.
Tyndall, Gladys
#4
King, Robert H.
#5
Ambroz. Margaret
Champlin, Margaret
Winings, Julia
#10
*Elliott, Mabel
Gayler, Dorothy
Phillips, Norma
Russell, Jessie
#17
*Parker, Frederick A.
#35
Hall, Cleo
#39
Green, Eula E.
#52
*Apostol, Panoria
#72
McClure, Byre
Schaefer, Charlotte S.
#76
Burton, Martha
Parner, Marie
#81
Shumar, Pauline M.
Arsenal Tech. H. S.
*Belding, Robert V.
*Carey, Dorothy
*Corbin, Carl
*Ewing, Sara C.
Hall, Newell
*Krickenberger, W.
*Kudig, Geraldine
McClintock, Cecil
*Pearson, Helen
Shannon, James V.
*Welchons, A. M.
Attucks H. S.
Hancock, Katherine
White, Geo. E.
Broad Ripple H. S.
*Green, R. L.
*Groves, Wm. H.
*King, Miriam
*Mahin, Albert
Butler University
*Beal, Juna L.
Carmichael, Byron
Crull, Harry E.
Gamoill, Robert
Popplewell, Elsie
Potzger, J. E.
Reinacker, Dorothy
Reisinger, Donald
Whitaker, Shirlene
White, Anna
Ben Davis H. S.
*Martin, Nina
Emmerich Manual Training H. S.
*Coleman, Ada M.
*Foreman, Garnett
Kuehrmann, Otto W.
Thornton, Eva M.
Howe H. S.
Brandt, N. Steale
Geier, Alvin
*Lemley, Fred C.
Loew, Mildred
*Ludlow, Herbert G.
Reed, Ruth
Calvin Kendal J. H.
Minor, Flossie S.
Park School
Palmer, Carl E.
Purdue University Ext.
Suter, Anna K.
Shortridge H. S.
*Burton, Enoch D.
Custer, Grace
Goodnough, Florence
Hunt, Martha
Keasling, Claude M.
Ocker, Ellen
*Peirson, Margaret B.
Speedway
*Kopesky, Helen
Tudor Hall School
*McColgin, Gladys B.
Semmes, Shelby
Wells, Ruth E.
Warren Central
Dinn, Irvin E.
Warsaw J. H.
Pfeiffer, Isabel
Warsaw, S. H.
Pfleiderer, Esther
George Washington H. S.
*Barker, Grace H.
Campbell, Ross T.
Ely, Vivian B.
Gingery, Walter G.
Heathco, Nell
Jones, Rowland
*Sims, Arthur
*Wilcox, Marie S.

IOWA
Cedar Falls
*Gibb, Glenadine
*Heade, Vernon
*Layne, Fay
*Van Engen, H.
Davenport
*Kerr, Orra A.
*Staffelbach, Hazel
Des Moines
Lynam, Ronald H.
Iowa City
*Price, H. Vernon
*Spitzer, Herbert

KANSAS
Lawrence
*Ulmer, Gilbert
Lindsberg
*Marm, Anna

KENTUCKY
Anchorage
*Wood, Edith
Ashland
*Brookover, Mary R.
Bowling Green
*Gilbert, Dawn
*Jones, Edwina C.
*Wright, Bernice
Covington
*Jackson, William N.

Farmington
*Fugua, Elizabeth
Dayton
*Blakeley, Laura
Independence
*Taylor, Elma
Louisville
*Gregory, M. Cottells
Shelbyville
*Sleadd, Agnes

LOUISIANA
Baton Rouge
*Karnes, Houston T.
Lafayette
*Heard, Ida Mae
*Loflin, Zeke L.

MARYLAND
Annapolis
*McRae, Helene
Baltimore
*Blakiston, Nanette R.
*Bowers, Eunice
*Gardner, Elizabeth C.
*Herbert, Agnes
*Tillinghart, R. B.
*Winkelblech, B. F.
Princess Anne
*Turner, Ethel

MASSACHUSETTS
Boston
*Betts, Barbara B.
*Buckingham, B. R.
*Carnahan, Walter H.
*Gifford, Anna S.
*Syer, Henry W.
Newtonville
*Mergendahl, Charles

MICHIGAN
Ann Arbor
*Chipman, Hope
*Jones, Phillip S.
*Schorling, Raleigh
Battle Creek
LaPeer, Kathryn
Rosa, Daisy M.
Seedorff, Ava
Wakefield, Hazel
Benton Harbor
Bolarjack, Hobert
Detroit
Dolan, Geraldine
Frey, Franklin
*Junge, Charlotte
Mason, Elizabeth
*Mueller, Clara H.
Lansing
*Blyth, M. Isabel
Junge, Ruby
Flint
Adams, Marjorie
*Adams, Wilma
*Safford, Carl R.
Holland
*Shoup, Emily
Kalamazoo
*Butler, Charles H.
*Myers, Sheldon S.
Lawton
Martin, L. J.
Marquette
*Bjork, Clarence
*Boynton, Beatrice
*Boynton, Holmes
Midland
Benfer, Donald
Sault St. Marie
*Joslin, Ethel M.
Waterliet
Hackett, Herbert

MINNESOTA
Alexandria
*Norskog, Edna M.
Minneapolis
Anderson, G. L.
*Johnson Donovan
*Woolsey, Edith
Northfield
*Beasley, S. L.
Winona
Sr. A. Kempis
Sr. Schulte

MISSISSIPPI
Raymond
*Stewart, Lurline

MISSOURI
Bolivar
*Spurgeon, Vivian
Clayton
*Montgomery, Gaylord
Columbia
*Doolittle Nettie
Kinksville
*Jamison, G. H.
*Knowles, Lois
*Leonhardy, Adele
St. Louis
Craig, Robert S.
*Dietz, Paul
*Everly, Jack
*Marth, Ella
Rodewald, Elizabeth
Warrensburg
*Brown, Claude H.

NEBRASKA
Lincoln
*Ellis, Edith
*Hall, Ruth N.
Ord
*Holden, Maude
Lincoln
*McMahon, Grace
*Perry, Winona

NEW JERSEY
Montclair
*Brune, Irvin
*Fehr, Howard F.
*Mallory, Virgil
Rutherford
*Higgins, William
Summit
Geise, Stanley
Trenton
*Shuster, C. N.
Shuster, Edith G.
Westfield
*Rogers, Mary C.

NEW YORK
Brooklyn
*Cowles, William
*Lazar, Nathan
*Sueltz, Ben
Farmingdale
*Feinstein, Anita
Floral Park
*Anderson, Alfred
*Clark, John
Ithaca
*Pingry, Robert
New York City
*Clark, John R.
Clark, Caroline
Crooks, Jack
*Foran, Francis
*Johnson, Esther
Ross, Pearl
*Peters, Ann C.
Pick, Anita
*Reeve, William D.
Oneida
*Burns, Frances
Oneonta
*Sanford, Vera
Rochester
*Betz, William
Staten Island
*Brown, Kenneth
Utica
*Kotler, David
Yonkers
Wickham, J. J.
Wickham, Joseph

NORTH CAROLINA
Durham
Rankin, W. W.
Greenville
*Scott, P. C.

OHIO
Alliance
Difford, Lionel
*Freese, Frances
Bixley
*Schacht, John F.
Brilliant
*McCune, Mary P.
Cincinnati
*Becker, Marie
*Keiffer, Mildred
*McNelly, Nanabel
*Struke, Norma
Cleveland
*Forthofer, Ambrose
*Grime, Herschel
*Lyon, Florence
*Kraft, Ona
*MacLearie, James
*Miller, A. Brown
Columbus
*Barcus, Howard J.
Billman, Neil
*Fawcett, Harold
Guesman, A. L.
*Heinke, Clarence
*Hoffert, Margery
Holmes, Darrell
*Jones, Sam B.
*Kinsella, John J.
*Smith, Eugene P.
*Stapleford, Edward
*Thomas, Edward J.
*Waters, Ralph R.
Defiance
*Godfrey, Edwin L.
Findlay
*Bell, Genelle
Hamilton
*Koger, James K.
Kent
*Harshbarger, Frances
Liberty Center
*Brown, J. James
Mansfield
*Brune, Dorothy
Juniper, Ralph
*Lantz, William

Oberlin
*Newsom, C. V.
Oxford
*Schluter, I. L.
Parma
Lentz, Donald
Shaker Hts.
*Miller, Florence B.
Sylvania
*Sr. Mary Alberta
Toledo
*Sr. N. Constantia
Wyoming
*Naugle, J. V.
*Naugle, J. V. (Mrs.)
Youngstown
*Wilson, Pauline

OKLAHOMA
Oklahoma City
*Gardner, Dan
Norman
*Lewis, Eunice
Tulsa
*Lavengood, L. W.

PENNSYLVANIA
Bradford
*Downing, Freas
Indiana
*Mahachek, Joy
McKeesport
*Richardson, Amelia
Millersville
*Boyer, Lee E.
Philadelphia
*Linton, M. Albert
Pittsburgh
Boyle, M. Matthias
*Lyons, Catherine
*Sr. M. Tarcisius
Stroudsburg
*May, Jonas T.

SOUTH DAKOTA
Rapid City
*Krieger, Florence

TENNESSEE
Johnson City
Carson, Thos. C.
*Cloyd, Velma
Knoxville
Cooley, James
Nashville
*Wren, F. Lynwood
Wren, Mrs. F. L.

VIRGINIA
Charlottesville
*Lankford, Frank
Farmville
*Sutherland, Ethel
Richmond
*Auetbach, Mamie

WEST VIRGINIA
Kenova
*Hardgrove, C. E.
St. Albans
*Lynch, Kathryn

WISCONSIN
Beloit
*Miller, Hilda
LaCrosse
Stokke, Carrol
Madison
*Mayer, John
Milwaukee
Brough, Marion
*Joseph Margaret
Racine
*McNair, J. S.
*Potter, Mary A.
Superior
*Person, Ruth
Wauwatosa
*Striegl, Margaret

CANADA
London
*Strangways, Douglas
Newmarket
*Rourke, Robert

* Stands for Members,

VOTE BY STATES, ANNUAL ELECTION MARCH 1948.
COMPILED BY EDWIN W. SCHREIBER, SECRETARY

Ala.	9	Iowa	18	N.H.	6	S.D.	5
Ariz.	11	Kans.	33	N.J.	63	Tenn.	11
Ark.	5	Ky.	8	Nev.	1	Tex.	24
Calif.	38	La.	17	N.M.	7	Utah	1
Colo.	35	Me.	1	N.Y.	105	Vt.	4
Conn.	20	Md.	21	N.C.	12	Va.	21
Del.	4	Mass.	5	N.D.	2	Wash.	6
D. of C.	32	Mich.	51	Ohio	49	W.Va.	9
Fla.	27	Minn.	20	Okla.	29	Wis.	40
Ga.	11	Mo.	6	Ore.	7	Wyo.	6
Idaho	1	Miss.	8	Penna.	53		
Ill.	142	Mont.	0	R.I.	5		1078
Ind.	70	Neb.	13	S.C.	6		

ATTENDANCE BY STATES

	Mem.	Gt.	Total
Ark.		1	1
Calif.	3		3
Colo.	4	3	7
Ga.	2		2
Ill.	72	49	121
Ind.	181	218	399
Indianapolis	(35)	(71)	(106)
Iowa	8	1	9
Kans.	2		2
Ky.	11		11
La.	3		3
Md.	8		8
Mass.	6		6
Mich.	16	12	28
Minn.	4	3	7
Mo.	10	2	12
Miss.	1		1
Neb.	5		5
N. J.	5	2	7
N. Y.	18	6	24
N. C.	1	1	2
Ohio	38	6	44
Okla.	3		3
Penna.	8	1	9
S. D.	1		1
Tenn.	2	3	5
Va.	3		3
W. Va.	2		2
Wis.	7	2	9
D. of C.	7		7
Canada	2		2
	434	310	744